(2)

UV Oscillograph SE6300

Instruction Manual

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EMI SE Labs

Instruction Manual

UV OSCILLOGRAPH

SE 6300

Issue 3

October 1980

MS 50087

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Manual Title: UV OSCILLOGRAPH SE 6300

HISTORY SHEET

MANUAL ISSUE	TEXT	CIRCUIT/LAYOUT DIAGRAMS	REMARKS
1			DECEMBER 1978 Operator's Manual only
2	Sections 5-8 added	Section 9 added	MARCH 1979 Extended into combined Operator and Service Manual.
3	Section 8 replaced by updated computer printout parts list. Supplement No. 6300 added.	- Illustrated Parts List for take-up unit added.	OCTOBER 1980 Updated to include new parts breakdown, information of the associated take-up unit, and all information previously issued as Technical Bulletins Nos.99,105,117.

PREFACE

DAMAGE IN TRANSIT

Unpack the equipment and examine it thoroughly to ascertain whether any damage has occurred in transit. Report immediately any such damage to the agent or manufacturer. Retain the four rubberized packing surrounds, should a return to manufacturer be necessary.

GUARANTEE

All goods manufactured by the Company are guaranteed to the extent hereafter mentioned against defects arising from faulty material or workmanship subject to the goods not having suffered maltreatment or interference. The Company's liability under this guarantee is limited to replacing any part or parts found defective within a period as laid down in Company instructions after the date of delivery or installation.

If goods not of the Company's manufacture are ordered,the guarantee of that company is to be accepted.

LOCAL AGENTS ADDRESS

The address of your local agent is:

DESCRIPTIVE MATTER AND ILLUSTRATIONS

Descriptive matter,illustrations,dimensions and weights issued by the Company are typical and shall not be held as binding.
The Company reserves the right to alter patterns and designs without notice.

SAFETY MEASURES

1. This instruction manual contains certain

   — CAUTION — and — WARNING —

   notices which *MUST* be followed by the user to ensure *SAFE* operation and to retain the equipment in a *SAFE* condition.

2. All users of the equipment described in this manual *MUST* have received adequate training in its use and application in order to ensure *SAFE AND PROPER USE*.

3. Any adjustment, maintenance and repair of the opened apparatus under voltage shall be carried out only by a skilled person who is *AWARE OF THE HAZARD INVOLVED*.

4. MEDICAL EQUIPMENT to be returned to SE Labs (EMI) Ltd., *must* indicate that it has been DE-CONTAMINATED.

UV OSCILLOGRAPH

SE 6300

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SECTION 1

SPECIFICATIONS

1. U.V.RECORDER SE 6300

Channels:	
SE 6300/12 (12 channels) SE 6300/24 (24 channels)	500 V d.c. insulation
Magnet Block Heater:	Thermostically controlled at 45 °C ± 3°C
Galvanometers:	SE standard miniature type with 325 mm optical arm.
Light Source:	100 W u.v. compact arc mercury lamp fed from regulated constant power supply and with automatic ignition.
Chart Speeds:	13-speeds from 0.5 mm/s to 5000 mm/s in two ranges: (a) 0.5,1,2,5,10,20,50 mm/s (b) above range x100
Chart Drive Accuracy:	Linear ± 3%
Run-Up Time:	Within 3% of speed in <300 ms
Auto Record:	0.5s,1s or 2s and continuous
Timing Lines:	Full width of chart
Timing Speeds:	0.002,0.01,0.1,1,10 and 100s and external.
Timing System:	R-C timer with ± 1% accuracy.
Grid Lines:	Spaced at 2 mm intervals with every 5th line accentuated.
Recording Paper:	Direct print up to 305 mm x 75 m, 25 mm or 28 mm cores.
Writing Speed:	2000 m/s dependent on type of recording paper.
Intensity Controls:	A pair of independent levers for Trace and Grid.

Event Marker:	One mirror type SE 2011 mounted on side of galvanometer block.
Reference Marker:	Two datum mirrors No. C5043
Remote Facilities:	(a) Variable speed control (chart speed proportional to input voltage 5V-25V) (b) Speed setting selection (c) Event marker (d) Time marker selection (e) External trigger to timer (f) Record period selection (g) Start/Stop
Front Panel Controls:	(a) Mains on pushbutton (b) Remote pushbutton (c) Chart speed x100 pushbutton (d) 2 pushbuttons for chart speed selection (e) 2 pushbuttons for record period (duration) selection (f) 2 pushbuttons for time marker period (g) Event marker pushbutton (h) Start pushbutton (j) Trace intensity lever control (k) Grid intensity lever control
Front Panel Indicators:	(a) Lamp Error LED indicator (b) Drive Error LED indicator (c) Remote LED indicator (d) Chart speed x100 selected LED indicator (e) 7 chart speed LED indicators (f) 4 record period LED indicators (g) 7 time marker period LED indicators (h) Start LED indicator (j) Paper Low LED indicator
Rear Panel Connectors:	(a) 5-way DIN socket for variable speed control (b) 25-way Cannon D socket for other remote control facilities (c) 12-way Plessey 'multicon' connector per 6 channels.
Options:	Rack mounting
Trace Identification and Numbering:	Sequential interruption of traces with channel numbering projected on left-hand side of chart.
Power Requirements:	115 V ± 15% or 230 V ± 15% at 50 Hz-60 Hz selected by rear panel rocker switch (locked in position by bolt-on plate). Flying mains lead supplied.

Fuses:	Rear panel mounted fuses for mains input lines, lamp and motor supplies.
Power Consumption:	450-550 VA
Operating Temperature:	10°C to 40°C
Storage Temperature:	-20°C to +70°C
Overall Dimensions:	(a) Width: 451 mm (b) Depth: 508 mm (c) Height: 222 mm
Weight:	30 kg.

2. GALVANOMETERS

Type:	Moving coil.
Linearity of Deflection:	± 1% over ± 5 cm from centre position.
Balance Range:	0.1 mm to 1 mm per g.

Type	Natural Freq. Hz	Flat Freq. Response (±5%) Hz	Nominal Galvo. Res (±10%)	Damping Res	Max. safe Current mA r.m.s.	Galvanometer Sensitivity (± 10%) mA/cm	mV/cm
			Damping factor = 0.64 ± 0.05				
A35	35	20	47	350	10	0.0008	0.038
C.40	40	25	42	250	10	0.0016	0.067
A.100	100	60	42	100	10	0.0037	0.156
B.100	100	60	80	250	10	0.0025	0.20
B.160	160	100	90	250	10	0.0056	0.500
C.300	300	200	38	250	25	0.13	5
B.420	420	300	120	250	25	0.05	6
			Fluid – filled				
A.1000	1000	600	75	Fluid + 250	35	0.34	25
A.1600	1600	1000	85	Fluid	50	1.0	85
B.1600	1600	1000	37	Fluid	50	1.1	40.70
A.2500	2500	1600	70	Fluid	50	2.0	140
A.3300	3300	2000	42	Fluid	50	7.5	315
B.3300	3300	2000	36	Fluid	50	4.2	151.20
A.5000	5000	3000	42	Fluid	50	16	670
B.5000	5000	3000	36	Fluid	50	10.0	360
A.8000	8000	5000	42	Fluid	50	25	1050
A 13000	13000	8500	70	Fluid	35	36	2520

NOTE: Due to constant development of galvanometers, specification changes are liable to occur without notice. Therefore, when ordering, please give details of the sensitivity, natural frequency and galvanometer resistance required.

Damping:	Electro-magnetic and/or silicon fluid.
Focal length of Lens:	35 cm.
Deflection Sensitivity:	See table above.
The sensitivities are quoted above with:	(i) Optical path length of 325 mm. (ii) Sensitivity and resistance tolerance of ± 10% (not including magnet block tolerance). (iii) No external damping resistor.
Dimensions:	(a) Length: 2.7in. (68.5 mm). (b) Diameter: (i) Top 0.125 in. ± 0.003 in. (ii) Bottom 0.0985 in. ± 0.005 in.

SECTION 2

GENERAL INFORMATION

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1. PRINCIPLE OF OPERATION

1.1 The principle of operation depends upon the incident light from a compact arc ultra-violet lamp being deflected,by the movement of a small mirror attached to the galvanometer suspension,onto a roll of photo-sensitive paper. This produces a high contrast recording within a few seconds under normal ambient light conditions. The paper may be driven at various speeds. The chart readout can contain signal traces,vertical grid lines,horizontal timing lines,a pair of margin references,event marker and trace number identification.

2. INTRODUCTION TO THE RECORDER

2.1 The SE 6300 UV Recorder is a sophisticated low cost recorder having a 100 watt compact arc mercury lamp using direct print oscillographic paper up to 305 mm wide with 25 mm or 28 mm core diameter.

2.2 The u.v.lamp is powered by a 'constant lamp power' regulating supply and features an 'automatic lamp strike' circuit which is interlocked such that should the lamp extinguish and fail to re-strike,all record functions are inhibited.

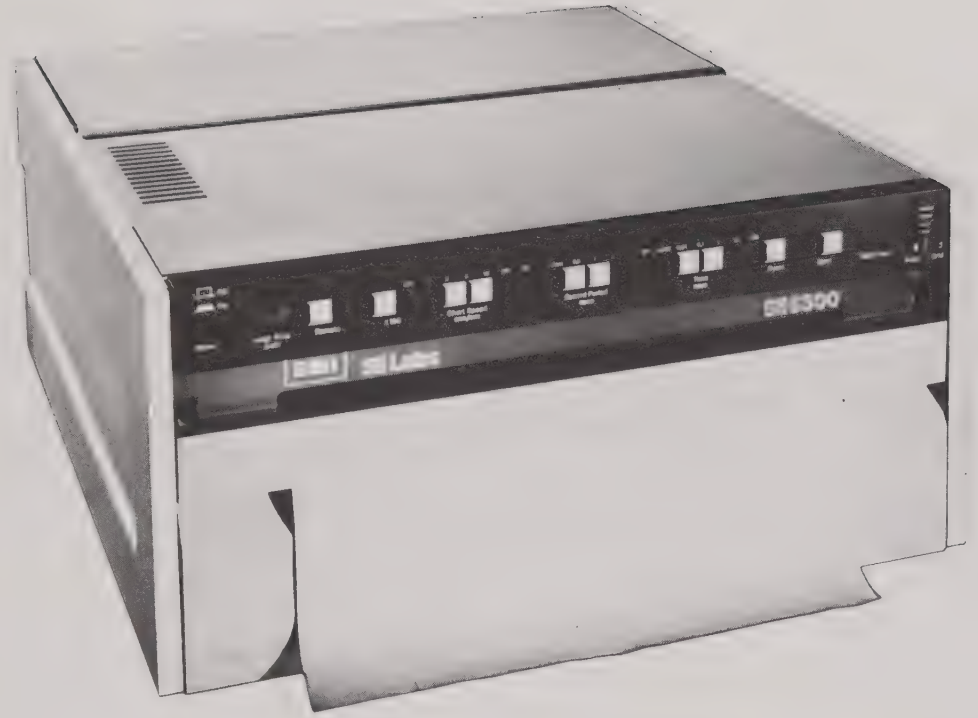

FIG.2.1 SE6300 RECORDER GENERAL VIEW

2.3 The chart drive system is servo-controlled with electronic selection of chart speeds. These may be selected in 13 discrete steps by 3 pushbuttons on the recorder front panel,or programmed remotely.

3. STANDARD READ-OUT FACILITIES

3.1 Channels

Up to 24 channels can be recorded onto a roll of direct print-out paper,which should be rolled emulsion side inwards. The paper can be up to 305 mm wide and on a 25 mm or 28 mm diameter core. The length of paper depends on its thickness but can be up to 75 m ultra-thin. Each trace can be deflected over the full width of the recording paper within a linearity of ± 1% over ± 50 mm deflection from its centre. The intensity of the traces can be adjusted by a front panel lever control.

3.2 Reference Traces

Two datum mirrors print reference trace lines down the length of the recording paper. Each mirror can be swivelled to print a line in any vertical position required.

3.3 Event Marking

A mirror type SE 2011 event marker unit is fitted to the left side of the galvanometer block. It can be swivelled to any convenient rest position. It can be manually operated either from a front panel push-button or through a remote socket on the rear panel. The unit operates like a relay except that instead of having contacts,it has a small mirror mounted on its armature which thus deflects a spot of u.v. light giving a blip on the paper.

3.4 Grid Lines

Grid lines are printed down the paper at 2 mm spacing with every 5th line accentuated. The intensity of this grid can be adjusted by a front panel lever control,independently from that of the trace.

3.5 Timing Lines

The timer fitted to this recorder is an R-C operational amplifier relaxation oscillator type having a timing accuracy of ± 1%. Timing lines are printed across the full width of the paper at intervals of 0.002s,0.01s,0.1s,1s,10s and 100s by a linear Xenon stroboscopic flashtube. This can also be externally triggered up to a maximum flashing rate of 500 per second.

3.6 Trace Numbering

Numbers are printed at the left-hand edge of the recording chart which are in line with sequential breaks appearing in the signal traces. A recording channel is identified by referring a number to a respective break.

3.7 Record Period Selection

To avoid wastage of paper,this facility makes it possible to select intervals of time over which chart drive is required. Drive is initiated from the START button and automatically stops after 0.5s, 1s or 2s as selected. The START button must then be pressed only once in order to begin another recording.

3.8 Chart Speeds

These are selected by pushbuttons on the front panel. The basic range is 0.5 mm/s,1 mm/s,2 mm/s,5 mm/s,10 mm/s,20 mm/s and 50 mm/s. Another button multiplies these speeds by 100,giving 13 speeds from 0.5 mm/s to 5000 mm/s. As the drive system is completely electronic,the system can also be remotely programmed.

4. GALVANOMETER BLOCKS

4.1 The SE 6300 recorder offers a choice of a 12-channel or 24-channel heated galvanometer block.

4.2 *Voltage Rating*. Both inputs to any one galvanometer can be raised together to a maximum of 500 V d.c., at the same time observing the maximum safe current stated for each particular galvanometer. It should be noted that as one contact is made to the galvanometer body, an insulation breakdown to the galvanometer block or to the body of another galvanometer could occur if this voltage is exceeded.

5. GALVANOMETERS

5.1 The recorder utilises SE Labs galvanometers covering the frequency range 0 to 13 kHz. These are plug-in pencil types which when located into plastic inserts in the galvanometer block,make contact with a pair of spring-loaded plungers. The optical alignment of a galvanometer can be adjusted through an access flap in the top of the recorder cover.

5.2 Galvanometers for the lower frequency ranges are electromagnetically damped. Those in the mid-frequency range are damped by a small amount of silicon fluid in addition to the external damping resistor. Those in the highest frequency range are damped solely by silicon fluid.

5.3 The viscosity,and thus the damping moment of the silicon fluid,is held constant by a pair of thermostatically controlled heaters,which maintain the temperature of the galvanometer block.

NOTE: Specification figures for the galvanometers are given in *Section 1,Sub-Section 2.*

6. REMOTE FACILITIES

The front panel REMOTE button selects local and remote control of speed,duration and time interval ranges. START/STOP and EVENT MARKER remote facilities may be used in conjunction with their local controls. Their functions are unaffected by the state of the remote/local range selection facility.

7. ACCESSORIES

7.1 Rack Mounting Kit E85840

This is a tray assembly with 24-inch slides used to mount the recorder in a 19-inch wide by 25-inch deep rack.

7.2 Galvanometer Conditioning Amplifier SE 993

This is a 6-channel active conditioning system to drive medium and high-current galvanometers from input signals in the range 0.5 V peak to 500 V peak.

7.3 Transducer Bridge Conditioning Unit SE 994

This is a 6-channel d.c. transducer bridge conditioning amplifier designed for use with the SE 993 amplifier above. The SE 994 accepts inputs from transducers and thermo-couples.

7.4 Transducer Bridge Conditioning Unit SE 995

This is a 6-channel a.c. transducer bridge conditioning amplifier suitable for use with the SE 993 amplifier above. The SE 995 accepts inputs from a variety of inductive or resistive transducers, linear variable differential transformers and high output strain gauge transducers.

SECTION 3

INSTALLATION

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1. INTRODUCTION

This section contains information necessary to prepare the recorder for use.

2. EQUIPMENT LIST

(a) SE 6300 UV Oscillograph fitted with UV lamp (1-off).
(b) Galvanometer adjusting tool : SEL C16861 (1-off) fitted in recorder.
(c) Paper Spool (1-off).
(d) Free connectors as follows:
    (i) Galvanometers : 12-way free socket Plessey Multicon 71/10/1253/03 (per 6 galvanometers).
    (ii) Remote Control: 25-way free plug Cannon D DB25P (1-off).
    (iii) Variable Speed: 5-way free plug Hirschmann MAS5S (2-off).
    (iv) Mains Lead and Connector : C44322 (1-off).

(e) Spare fuse links as follows:
    (i) FS1 : 6.3A (110 V) or 3.15A (220 V)
    (ii) FS2 : 3.15A Fastblow
    (iii) FS3 : 3.15A Fastblow
    (iv) FS4 : 500 mA
(f) Dust Cover (1-off)
(g) Instruction Manual

3. RACK MOUNTING

The recorder is built as a table model,but if a rack mounting facility is required,a special rack mounting tray system can be supplied. This comprises a tray fitted with standard Imhof rack slides on each side. The base has four nesting blocks into which the recorder is located, and a front lip fitted with a locking mechanism on each side to secure the tray to the rack.

4. PRECAUTIONS

4.1 UV Light

The light from the ultra-violet lamp is injurious to the eyes,and must not be viewed directly unless protective eye glasses are worn. These are obtainable from SE Labs (EMI) Ltd. (Pt.No.XS 29042).

4.2 UV Lamp

The UV Lamp must only be touched when cool,and then only by the metal end caps. If at any time the quartz bulb is handled,any grease marks must be removed with alcohol and a lint-free cloth. During normal operation,the lamp operates at a very high internal pressure.

4.3 Dust Cover

The exclusion of dirt from the recorder is an essential requirement, and when the recorder is not in use,the plastic dust cover should be fitted.

4.4 Air Circulation

It is essential that the vents around the recorder are not blocked and that adequate space is left for ventilation.

4.5 Recording Paper

The recording paper has a limited shelf-life and,if kept cool, can be stored for a maximum period of 6 months. After this there is a progressive loss of contrast and reduction in writing speed. The paper must not be directly exposed to strong sunlight during loading or after recording,unless it has been chemically stabilised. Before loading the paper into the cassette,ascertain that the paper is rolled squarely so that the overall width of the paper can be accommodated with ease. The permanence of the record under average lighting is a few days. If it is required to keep the record longer,a stabilising lacquer can be sprayed

on,which keeps the recording intact for a number of weeks. If archival stability is required,the record must be chemically processed (see *Appendix A & B*).

4.6 Galvanometers

Although each galvanometer is reasonably robust it should be handled with care to avoid distortion of the case or damage to the lens. The tubular body has a wall thickness of approximately 0.008in. (0.2mm) and can easily be distorted;this may not break the galvanometer but it will affect the balance.

4.7 Magnet Block

Avoid using steel tools on or near the magnet block,as ferrous particles may be attracted to the pole pieces and affect magnetic flux distribution or destroy the electrical insulation. When making adjustments,always use the non-magnetic tool provided.

4.8 Mains Check

Before connecting the recorder to the mains supply,check that the machine matches the supply to be used (see para 5.1). Only the live mains input is fused and this should have a value of 6.3A (110 V) or 3.15A (220 V).

5. CONNECTING THE RECORDER

5.1 Mains Connection

5.1.1 The recorder mains lead should be wired to a suitable mains plug as follows:

WIRE COLOUR	FUNCTION
Brown	Live
Blue	Neutral
Yellow/Green	Earth

5.1.2 The recorder is capable of either 115 V or 230 V operation,which is selected by the MAINS SELECTOR rocker switch. The switch is then locked in position using the plate provided. The locking plate also indicates the value of mains fuse to be employed.

5.2 Remote Control Socket (fig 3.1)

This is a 25-way Cannon D socket for input and output of remote facilities. The functions and connections are tabulated below:

PIN NO.	FUNCTION	ACTION
1 2 14	Remote Time Selection	See truth table in para 6.5.
3 4 15 16	Remote Speed Selection	See truth table in para 6.4.
5 17	Remote Record Period Selection	See truth table in para 6.6.
6	Lamp Error Output	0 V indicates fault.
7	Remote Control Selected Output	0 V indicates remote control selected.
10	0 V	Reference pin/source of logic 1.
11	Stop Input	0 V applied stops recorder.
12	External Select Input	0 V applied selects external time line trigger.
13	Timer Clock Output	Selected time line trigger output.
18	Drive Error Output	0 V indicates fault.
19	Paper Low Output	0 V indicates paper low.
20	Recorder Running Output	0 V indicates recorder running.
22	0 V	Reference pin/source of logic 1.
23	Start Input	0 V applied starts recorder.
24	Event Marker Input.	0 V applied activates event marker.
25	External Clock Input	External time line trigger input.

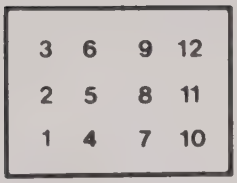
5.3 Variable Speed Control Socket (fig 3.1)

This is a 5-way DIN socket for the input of an external chart speed control voltage (+5 V to +25 V).

5.4 Test Socket

Servicing aid only.

Galvanometer Inputs



Pins	1 + Ve 4 – Ve	Ch 1,7,13,19.
Pins	2 + Ve 5 – Ve	Ch 2,8,14,20.
Pins	3 + Ve 6 – Ve	Ch 3,9,15,21.
Pins	7 + Ve 10 – Ve	Ch 4,10,16,22.
Pins	8 + Ve 11 – Ve	Ch 5,11,17,23.
Pins	9 + Ve 12 – Ve	Ch 6,12,18,24.

Variable Speed

1	Ov	
2	Input	Pins 2&4 Linked Until Plug Inserted
3	—	
4	25v Ref	
5	—	

Test

1	—
2	—
3	Ov Power
4	—
5	Motor Test

Remote Control

SEE MANUAL FOR PIN FUNCTIONS

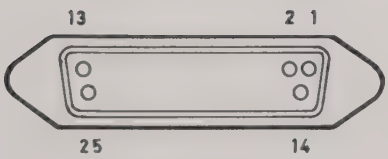


FIG. 3.1 CONNECTOR PIN ALLOCATIONS (VIEWED FROM REAR PANEL)

6. REMOTE CONTROL SIGNALS

6.1 Logic Definition

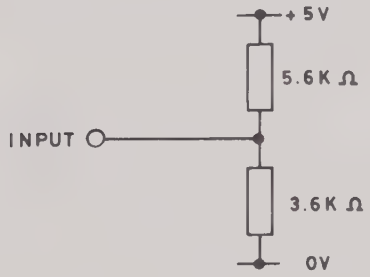
Input:

LOGIC 1 = -3V → -10V
LOGIC 0 = +3V → +10V

Over short runs 'TTL' levels may be used.

LOGIC 1 = 0V
LOGIC 0 = +5V

Input Equivalent Circuit:



Logic levels are referenced to pins 10 and 22 (0V). An open circuit input is interpreted as logic 0.

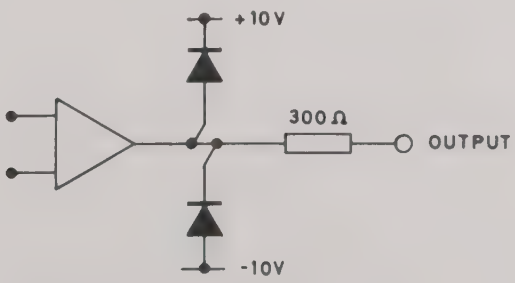
Output Stage:

LOGIC 0 = +10V
LOGIC 1 = -10V

No load voltages

Output current limited to ± 10 mA nominal.

Output Equivalent Circuit:



6.2 Remote Control Selected

Pin 7 remote control - logic 1 output.

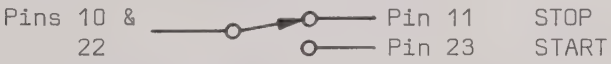
6.3 Remote Start/Stop

Pin 23 ------- START
Pin 11 ------- STOP

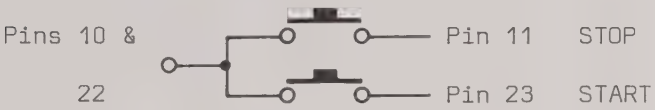
- apply logic 1 to pin for operation.
- logic 1 on STOP overrides START.
- local start/stop inhibited while logic 1 is present on either input.
- to repeat a timed RECORD PERIOD ,START must first be taken to logic 0.

2 Line Operation

(a) Single pole change over switch.



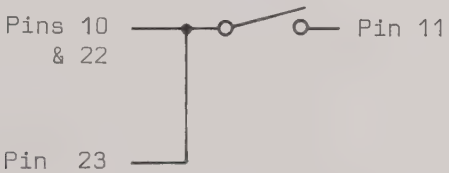
(b) Two momentary contacts



(c) Applied logic levels.

1 Line Operation

(a) Single pole switch



switch OPEN ..... START
switch CLOSED..... STOP

(b) Timed Record Period - momentary contact

6.4 Remote Speed Selection

	Truth Table				Division Ratio	
	Pin 4	Pin 16	Pin 3		(x1)	(x100)
Pin 15 x100 - logic 1	0	0	0	0.5 mm/s	10,000	100
	0	0	1	1.0 mm/s	5,000	50
	0	1	0	2.0 mm/s	2,500	25
	0	1	1	5.0 mm/s	1,000	10
	1	0	0	10.0 mm/s	500	5
	1	0	1	20.0 mm/s	250	2.5
	1	1	0	50.0 mm/s	100	1
	1	1	1	OFF		

6.5 Remote Time Selection

Truth Table				Division Ratio
Pin 2	Pin 14	Pin 1		
0	0	0	OFF	
0	0	1	2 ms	1
0	1	0	10 ms	5
0	1	1	100 ms	50
1	0	0	1 s	500
1	0	1	10s	5000
1	1	0	100s	50000
1	1	1	OFF	

Pin 12 external select - logic 1 input selects external trigger.

Pin 25 external clock in - max. 500 Hz square wave. With local control selected the pulse rate is divided in the recorder circuitry by the ratio corresponding to the range selected on the front panel (see the truth table). With remote control selected,the flashtube is controlled entirely by the external trigger (i.e. no internal division).

Flash triggers from logic 0 → 1 transition.

Pin 13 Timer clock out at selected rate. Logic 0 → 1 transition coincident with flash.

6.6 Remote Record Period Selection

Truth Table		
Pin 5	Pin 17	
0	0	continuous
0	1	0.5 s
1	0	1.0 s
1	1	2.0 s

6.7 Remote Event Marker Control

Pin 24 Event - logic 1 input.

6.8 Status Outputs

Logic 0 on following pins indicates:

Pin 18	drive error
Pin 6	lamp error
Pin 19	paper low
Pin 20	recorder running

6.9 Variable Speed Control

The chart speed can be set to any value between 0.5 mm/s and 5 m/s by an external voltage applied in conjunction with the front panel chart speed selector. The voltage level is input via the back panel VARIABLE SPEED DIN plug. When local control is selected,the voltage is divided by the ratio corresponding to the chart speed range selected on the front panel (see the Remote Speed Selection truth table above). Voltages applied can be within the range +5V to +25V with +25V corresponding to a chart speed of 5 m/s. The external voltage level becomes effective as soon as the plug is inserted into the VARIABLE SPEED socket.

7. INPUT SIGNALS

7.1 Signal Connectors (fig 3.1)

Signals are input to the galvanometers via the 12-way multicon sockets on the back of the recorder,each of which serves 6 galvanometers (1-6, 7-12 etc).

7.2 Calculation of Galvanometer Damping Resistor

7.2.1 Two types of galvanometers are available:

(a) *Electro-mechanically damped.* The galvanometer drive circuit should be arranged such that it has the resistance required to produce the necessary damping,given by the reverse current produced by the back e.m.f. of the coil.

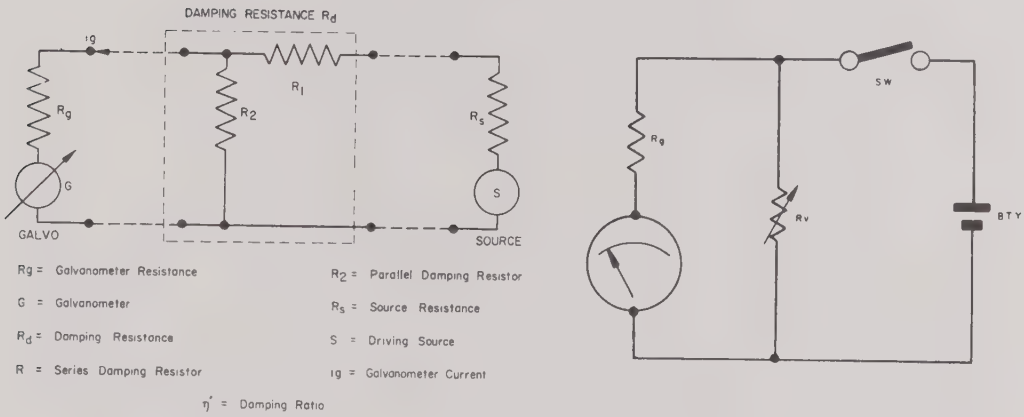
(b) *Fluid damped.* These have their coils surrounded by a silicon fluid of suitable viscosity to achieve the necessary damping.

Damping is necessary to provide the galvanometers with a level frequency response,a correct frequency/phase angle relationship and an overshoot of a controlled value between 0.6 and 0.7 of critical damping on the application of a step function input.

7.2.2 In order to determine the value of the damping resistor to be inserted it is necessary to know the source resistance (fig 3.2A):

(a) If the source resistance is greater than the required damping resistance,a parallel damping resistor R2 alone is required, R2 being given by:

$$R2 = \frac{Rs \times Rd}{Rs - Rd}$$



A. Circuit Diagram B. Determination of Damping

FIG 3.2 GALVANOMETER DAMPING NETWORK

(b) If the source is less than the required resistance,a series damping resistor R1 alone is required,R1 being given by:

$$R1 = Rd - Rs$$

(c) Both series and parallel resistors are required when the source is of high impedance,and delivers a voltage exceeding the safe maximum values for the galvanometers. The value of the parallel resistor,R2,can be determined from the equation:

$$R2 = \frac{(Rs + R1)\ Rd}{Rs + R1 - Rd}$$

7.2.3 To determine the damping resistance loading Rd,for any specified damping ratio,proceed as follows (fig 3.2B):

(a) Connect a variable resistor,Rv across the galvanometer and,by means of a d.c. supply,deflect the coil some appreciable amount, e.g.10cm,taking care not to exceed the maximum safe current for the particular galvanometer.

(b) Note the deflection amplitude,break the circuit abruptly and note the amplitude of the first overshoot.

(c) Repeat the procedure,adjusting Rv until the amplitude of the overshoot is exactly 25% of the amplitude of the steady deflection. This value of Rv corresponds to a damping ratio η of 0.4.

(d) Using the value of the coil resistance Rg taken from the table of galvanometer data,compute the value of the factor K/f_o from the equation:

$$K/f_o = \eta\ (Rg + Rd),$$

where f_o is the natural frequency of the galvanometer,Rd in this instance equals Rv,and K is constant.

(e) With K/f_o and Rg known,the value of Rd can be determined for other damping ratios by rearranging the above equation.

7.3 Optical Setting of Galvanometer

7.3.1 Before a recorder can be used,it is necessary to fit the required number of galvanometers and to adjust these optically in conjunction with the u.v.lamp. To accomplish this,proceed as follows.

(a) Open the hinged flap in the cover.

(b) Insert each galvanometer,mirror facing forward,into its selected aperture in the magnet block (see fig 3.3).

CAUTION

Although the galvanometers are reasonably robust in construction,they should be handled with care in order to avoid distortion of the tube or damage to the optics.

(c) Switch on power to recorder,wait at least two minutes until the lamp beam has stabilised,and adjust TRACE intensity to MAX.

NOTE: If necessary,check adjustment of u.v.lamp height. To gain access to the adjustment,lift rear section of top cover and remove control unit by loosening screws at its rear corners,disconnecting cableform,lifting the rear slightly and sliding forward clear of recorder. Rotate the adjustment screw which protrudes horizontally from the u.v.lamp box.

(d) Adjust the horizontal alignment of the light spot by rotating the galvanometer with special tool engaged in the slotted head (see fig 3.3).

CAUTION

Avoid using steel tools on or near the magnet block as ferrous particles may be attracted to the pole pieces and upset the magnetic field distribution or destroy the insulation of the block.

(e) Adjust the vertical alignment of the light spot by rotating the adjusting screw in the magnet block pole piece with the special tool (see fig 3.3).

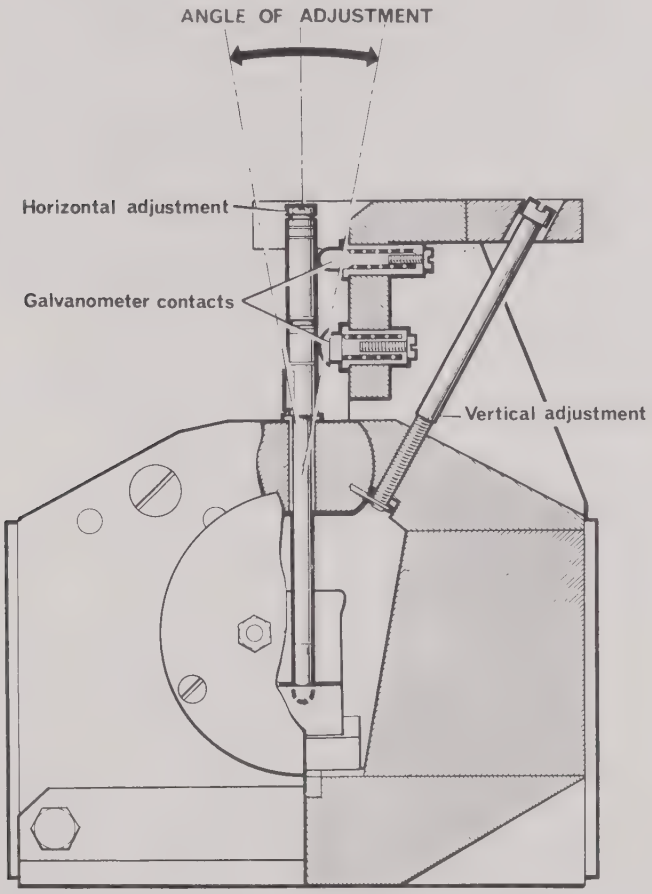


FIG 3.3 GALVANOMETER ADJUSTMENT

7.3.2 If the light spot cannot be seen on the paper,locate the spot position with the aid of a piece of paper,held in the light beam near the trace shutter,and viewed from either side of the recorder (with the cover off). Each galvanometer normally produces three light beams,one of which is brighter than the other two. This is the main trace and when located enables the galvanometer to be adjusted to project this beam through the trace shutter.

7.3.3 The individual intensity of each galvanometer can be adjusted by tilting it,using the vertical adjustment screw (fig 3.3). The final adjustment must be in a CLOCKWISE direction to take up any backlash that might be present.

7.3.4 If setting the galvanometer spot is impossible because of misalignment of the recorder optics,refer to *Section 7,Setting Up Adjustments.*

8. CHART LOADING

CAUTION

Paper loading must be carried out in subdued light to avoid impairing its recording quality. For recommended types, see *Appendix A*.

8.1 Removal of Empty Spool from Cassette

(a) Raise the cassette release flap and swing the cassette downwards.

(b) Withdraw the empty spool from its slots.

8.2 Paper Loading

(a) Separate the two parts of the spool by unscrewing the right-hand end cheek.

(b) Remove from the spool and discard the empty paper core.

(c) Holding the spool by its non-removeable left-hand end cheek in the left hand, slide a new roll of paper onto the spool so that the paper unrolls from the bottom.

(d) Replace the right-hand end cheek by screwing it onto the appropriate threaded stud tightly against the paper core.

(e) Lift and hold up the paper level sense lever inside the left-hand end of the cassette.

(f) Drop the paper spool into its slots and press in until a click from each end indicates that both ends of the spool are home; release the paper level sense lever.

(g) Ensuring that the paper still unrolls from the bottom and that the non-removeable end cheek is on the left, lay the paper over the drive roller with the emulsion side uppermost.

(h) Close the cassette and pull out a short length of paper by hand to check that the paper comes out squarely.

SECTION 4

OPERATING INSTRUCTIONS

Sub-Section	LIST OF CONTENTS	Page No.
1	Introduction	4.1
2	Summary of Controls,Connectors and Indicators	4.1
3	Recorder Operating Procedure	4.4
	Preliminary Steps	4.4
	Making a Recording	4.4
	Making an Automatic Recording	4.5
	General Operating Notes	4.5
	Remote Operation	4.7
4	Switching Off and Storage	4.8

1. INTRODUCTION

1.1 This section contains the operating instructions for the SE 6300 UV Recorder.

1.2 The initial setting-up procedure,connecting and paper loading for the recorder is contained in *Section 3 Installation*.

2. SUMMARY OF CONTROLS,CONNECTORS AND INDICATORS

2.1 Fig 4.2 shows a rear view of the SE 6300 Recorder. This diagram should be referred to when identifying the various connectors and fuses at the back of the instrument. Details of the control panel (fig 4.1) are given in the summary below.

2.2 For functions and wiring of the rear panel connectors refer to Section 3 Installation.

2.3 Summary of Recorder Controls & Indicators:

(a) MAINS On/Off Switch: A latching pushbutton which when depressed switches power to the instrument. The u.v. lamp automatically strikes. To switch off, the button must be pushed to release.

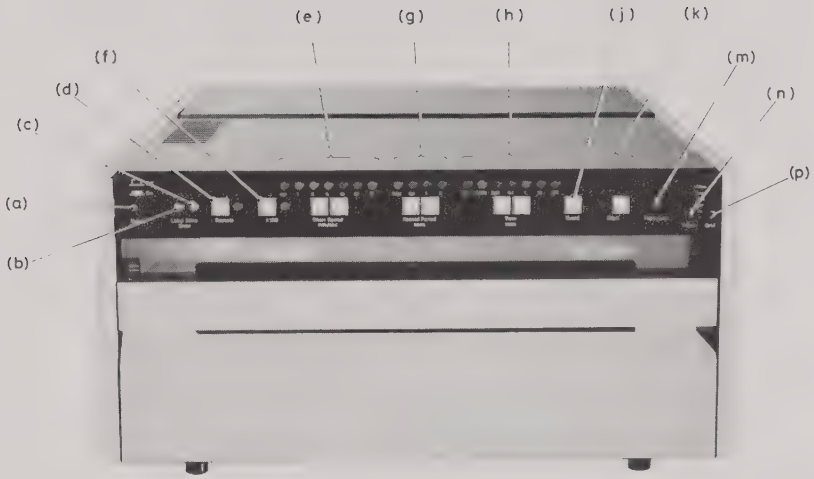


FIG. 4.1 CONTROLS AND INDICATORS (FRONT PANEL)

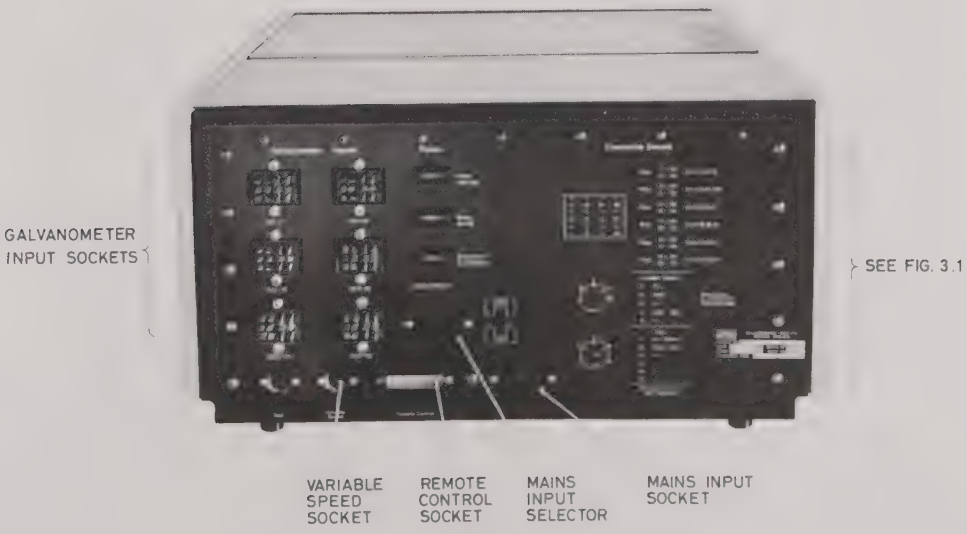


FIG. 4.2 CONNECTORS (REAR PANEL)

(b) LAMP ERROR Indicator: This is an LED indicator which is illuminated whenever mains power is on and the u.v. lamp HT supply is not up to normal operating level. The indicator comes on when mains power is first switched on and is extinguished when the u.v. lamp supply stabilises.

(c) DRIVE ERROR Indicator: This is an LED indicator which is illuminated whenever the chart drive has tripped out due to an overload.

(d) REMOTE pushbutton and Indicator: The momentary-action pushbutton selects remote or local control of chart speed, record period and time lines. The LED indicator is illuminated when remote control is selected.

(e) CHART SPEED Pushbuttons and Indicators : The right-hand and left-hand momentary-action pushbuttons cause the chart speed selection to move to the right and left, respectively. The range selected is indicated by one of the 7 LED indicators. The range selector steps once every 0.7s if one of the pushbuttons is held down. Otherwise,the selector steps each time a pushbutton is depressed and released.

(f) x100 Pushbutton and Indicator: This is a momentary-action pushbutton which causes the chart speed selected to be multiplied by a factor of 100. The LED indicator is illuminated when this facility is effective.

(g) RECORD PERIOD Pushbuttons and Indicators: The 2 pushbuttons and 4 associated LED indicators function in the same way as the CHART SPEED pushbuttons and indicators above in order to select the record period required.

(h) TIME Pushbuttons and Indicators: The 2 pushbuttons and 7 associated LED indicators function in the same was as the CHART SPEED pushbuttons and indicators above in order to select the time line spacing required.

(j) EVENT Pushbutton: This momentary-action pushbutton causes the mirror marker to deflect a spot of light on the paper,making one blip each time the button is operated.

(k) START Pushbutton and Indicator: When depressed once,this momentary-action pushbutton starts the chart drive. Depressing a second time stops the recorder. When the recorder stops automatically because of a selected record period of 0.5s,1s or 2s,the START pushbutton must then be depressed only once in order to restart the chart drive. The LED indicator is illuminated while the chart drive is active.

(m) PAPER LOW Indicator: This LED indicator illuminates when approximately 10% of the paper remains.

(n) TRACE Control: This is a lever which operates a shutter to control the intensity of the trace. Maximum intensity is at the top of its travel.

(p) GRID Control: This is a lever which operates a shutter to control the intensity of the grid. Maximum intensity is at the top of its travel.

3. RECORDER OPERATING PROCEDURE

3.1 Preliminary Steps

(a) Check that the instrument is suitable for the mains supply to be used and that the mains fuses are the correct value.

(b) Ensure that the free plugs are *not* inserted in the remote control sockets.

(c) Check that the appropriate signal inputs are correctly wired and galvanometers optically set. See *Section 3,Sub-Section 7*.

(d) Load paper.

(e) Switch on recorder power and allow about 2 minutes for the u.v. lamp to stabilise.

(f) Upon switching on,the controls automatically select the following conditions: 'local' control,CHART SPEED 0.5 mm/s, RECORD PERIOD 'CONT', TIME 'OFF'.

3.2 Making a Recording

(a) Set the intensity controls for trace and grid optics.

(b) Select a suitable chart speed for the signal to be recorded.

(c) Select a suitable timer speed if required.

(d) Set the RECORD PERIOD to CONT.

(e) Depress START button to commence recording.

(f) Depress START button again to terminate recording.

(g) To make an automatic recording see para 3.3 that follows.

(h) When switching from local to remote control and then back to local control the recorder remembers the last local control settings made and reapplies them upon switching back to local control.

3.3 Making an Automatic Recording

The RECORD PERIOD pushbuttons enable the user to select 3 intervals of time (0.5s,1s & 2s) after which a recording automatically stops. This avoids unnecessary wastage of paper when recording measurements of short duration. It should be remembered that about 300 ms should be allowed at each end of the recording to take account of acceleration and deceleration times.

(a) Proceed as for 3.2 (a) to (c).

(b) Select the appropriate record period.

(c) Depress START button.

(d) After the paper has automatically stopped the START button. can be depressed again in order to initiate a new recording.

3.4 General Operating Notes

3.4.1 It is recommended that an operator unfamiliar with this type of instrument makes some experimental runs to ascertain the best setting for the intensity controls,and the visual effect of different drive speed/timer speed combinations.(see fig 4.3).

3.4.2 If the RECORD PERIOD facility is not required,the 'CONT' position must be selected or no paper drive results. (The DRIVE ERROR indicator does *not* illuminate).

3.4.3 If a drive overload occurs during recording,the servo switches off (after about 15s if drive seizes),and the DRIVE ERROR indicator illuminates.

3.4.4 Should the u.v.lamp extinguish during a recording,the drive switches off and automatically re-commences if the lamp re-strikes

3.4.5 When making a succession of high speed recordings,it is advisable to pull out a short length of paper at the end of each run to prevent the possibility of loops of paper forming inside the cassette.

3.4.6 The recommended types of recording paper are detailed in ***Appendix A*** at the back of this manual. Writing speed is defined as the speed of spot deflection which will still print on the photographic material for maximum spot velocity (i.e. the centre of the peak-to-peak deflection). The actual figure obtained depends on many factors such as type and condition of paper,photo-development conditions,type of galvanometer and optical efficiency. The formula for a sinusoidal signal is given below.

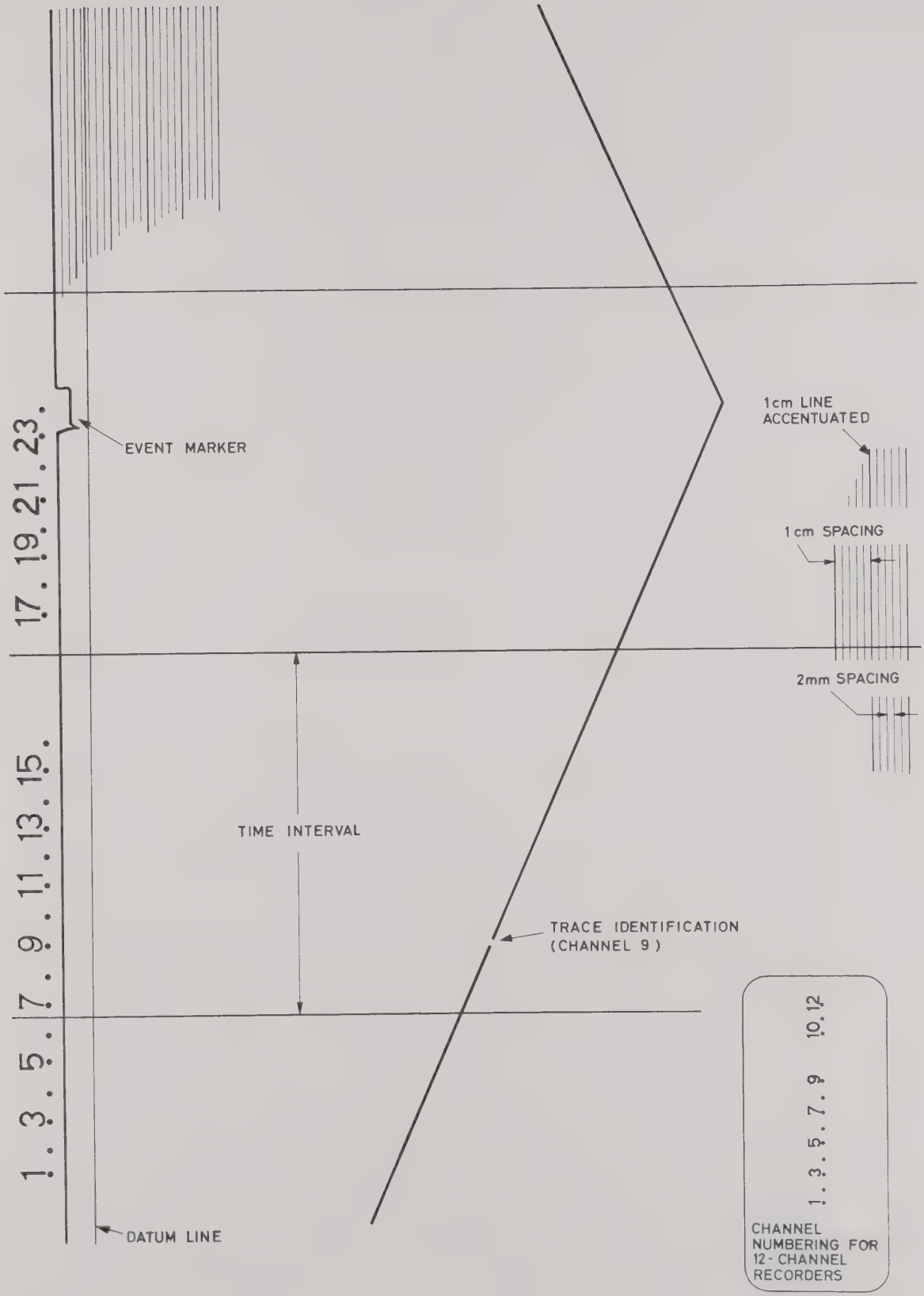

1. 3. 5. 7. 9. 11. 13. 15. 17. 19. 21. 23.
EVENT MARKER
1cm LINE ACCENTUATED
1cm SPACING
2mm SPACING
TIME INTERVAL
TRACE IDENTIFICATION (CHANNEL 9)
DATUM LINE
1. 3. 5. 7. 9. 10. 12.
CHANNEL NUMBERING FOR 12-CHANNEL RECORDERS

FIG. 4.3 IDENTIFICATION OF CHART FACILITIES

Writing Speed (m/s) = $\pi \times f \times d$

Where f = frequency of signal trace in Hz

d = peak to peak amplitude of the signal in metres

3.4.7 If traces or timing lines appear faint,the light sources may be ageing or the optics require cleaning or setting. General cleanliness, u.v. lamp renewal and adjustment are covered in the Maintenance Section of this manual.

3.4.8 Provided that the u.v.lamp is ignited,the timer flashtube operates immediately a timer speed is selected or an external timing pulse applied.

3.5 Remote Operation

3.5.1 The REMOTE CONTROL and VARIABLE SPEED sockets allow remote control of the recorder functions. The functions are distributed as detailed in Section 3.

3.5.2 The operating procedure detailed above should be followed but using those remote facilities that are required. The following notes regarding the use of these facilities should be referred to.

3.5.3 *Remote Control Socket* (refer also Section 3 para 5.2).

(a) *Start/Stop:* An external switch can be connected in various ways as detailed in Section 3 para 6.3. If desired,the RECORD PERIOD facility can be selected at the recorder control panel and the external switch used to start the recorder.

(b) *Event Marker:* This should be a pushbutton switch to momentarily join pins 10 (or 22) and 24 to cause the mirror marker to deflect.

(c) *External Clock Input:* To use this facility connect the external trigger to pin 25.

(i) The signal can be a squarewave of TTL level (+5 V amplitude) with respect to pin 10 or 22 over short runs or ±10 V over longer runs.

(ii) To select the external trigger,a logic 1 (0 V) must be input to pin 12 and the 0.002s TIME range selected on the front panel if a flash rate equal to that of the input frequency is required.

(iii) With the REMOTE facility *not* selected (REMOTE LED extinguished) the flashtube rate can be divided down by selecting other TIME ranges. (Refer to division ratios in Section 3 para 6.5).

(iv) If the TIME OFF range is selected,the flashtube ceases to flash.

NOTE: The flashtube must not be allowed to exceed a rate of 500 Hz.

3.5.4 *Variable Speed Socket.* The internal 25 V d.c. servo reference voltage is fed out to pin 4 which is linked to pin 2 of the socket when the DIN plug is ***not*** inserted. Pin 2 is wired to the CHART SPEED selector gating. The supply return is wired to pin 1. This enables the chart speed to be remotely programmed in several ways. Whichever system is used,the final input to pin 2 must be positive and applied with respect to pin 1. Fig 4.4 shows the internal arrangement of the input circuit to the servo drive. With the REMOTE facility ***not*** selected (REMOTE LED extinguished),whatever control voltage is applied to pin 2 is divided down according to the CHART SPEED range selected (Refer to division ratios in Section 3 para 6.4).

(a) A continuously variable voltage between +5 V and +25 V can be derived from pin 4 with respect to pin 1 and fed back to pin 2. In order for the chart speed to correspond exactly to the voltage applied to pin 2,range 5 m/s must be selected on the CHART SPEED selector (+25 V corresponds to 5 m/s).

(b) An external stepped potential divider network can be connected across pins 1 and 4 and its output fed back to pin 2.

(c) An independently derived voltage programme can be applied to pin 2 with respect to pin 1 within the constraints referred to in para (a) above.

(d) For the sake of accuracy it is preferable to use the x1 group of speed ranges,making the necessary control voltage input 100 times greater. This enhances the signal-to-noise ratio on the control line and maintains voltage-speed accuracy particularly at slow speeds.

4. SWITCHING OFF AND STORAGE

(a) Stop chart drive (if active) by depressing START pushbutton.

(b) Switch off power.

(c) Remove plug from mains.

(d) Remove paper and leave cassette partly open to prevent the possibility of a flattened edge developing on the drive or pinch roller.

(e) If table model,disconnect external leads and fit dust cover.

(f) If the instrument is to be stored for a prolonged period,a linen bag of silica-gel crystals should be placed inside the recorder to absorb any dampness. These should be removed every three months and re-activated by heating in an oven for one hour at approximately 200 °C.

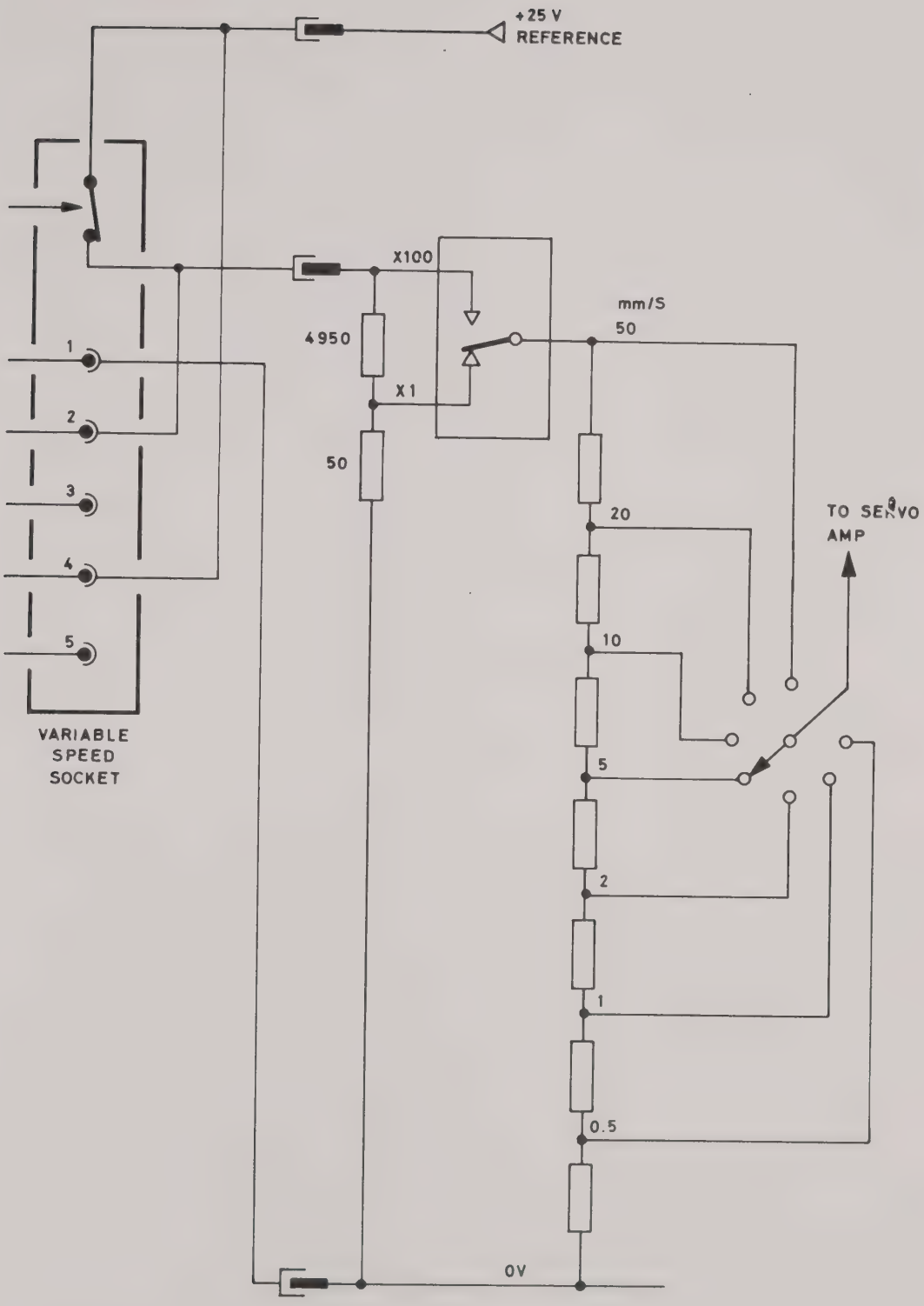


FIG.4.4 CHART SPEED SELECTOR SCHEMATIC

SECTION 5

SYSTEM DESCRIPTION

Sub-Section	LIST OF CONTENTS	Page No.
1	Introduction	5.1
2	Power Distribution	5.1
3	U.V.Lamp System	5.2
4	Chart Facilities	5.2
	Grid	5.2
	Time Lines	5.2
	Event Marker	5.3
	Reference Traces	5.3
	Trace Identification	5.3
	Trace Intensity	5.3
	Record Period	5.3
5	Drive and Brake System	5.5
6	Galvanometer Magnet Block	5.5
7	Galvanometers	5.5
8	Remote Control	5.7
	Remote Control Socket	5.7
	Variable Speed Socket	5.7
	Test Socket	5.7

1. INTRODUCTION

1.1 The principle of operation is that incident light from a compact arc ultra-violet lamp is deflected by the movement of a small mirror attached to the galvanometer suspension onto a roll of photosensitive paper. The paper may be driven at various speeds. In addition to signal traces the chart can include vertical grid lines,horizontal timing lines,a pair of margin references,event marker and trace number (channel) identification.

1.2 The internal mechanical and optical layout of the recorder is shown in fig 2 in SECTION 9. This figure is followed by component layouts, circuit and interconnection diagrams. Location of major sub-assembles is shown on fig 5.2 at the end of this section.

2. POWER DISTRIBUTION

2.1 The power distribution system comprises a mains plug,fuse and 115V-230V selector switch on the rear connector panel,a MAINS on/off switch on the front control panel,a mains transformer and 6 rectifiers to produce the various d.c. supplies used in the recorder. The mains transformer and 1 rectifier are mounted in the rear compartment of the recorder. The remaining 5 rectifiers are found on the capacitor chassis and on the power supply and lamp regulator board both mounted above the bottom cover plate of the recorder.

2.2 115V a.c. from the transformer primary is taken to the galvanometer block heaters via tag block TB20 located near the right end and on the rear face of the partition separating the mains transformer compartment from the central compartment of the recorder.

3. U.V. LAMP SYSTEM

3.1 The u.v.lamp is the light source for all signal and reference traces with the exception of the timing lines. The light is directed to produce the various traces by a system of mirrors.

3.2 The u.v.lamp is series regulated to keep the power constant at its nominal 100 watts. A high voltage is supplied to ionise the gas in the lamp initially. LAMP ERROR circuitry senses the lamp voltage and both operates the warning lamp and disables the chart drive when this voltage is outside of the normal working limits. This usually occurs either if the lamp is warming up,when a low voltage is sensed or if the lamp is old,when the voltage is high.

3.3 The u.v.lamp is located in a metal box inside the left side cover plate of the recorder. The lamp is connected by flying leads to the component chassis which contains the lamp drive components and ignition transformer. The component chassis is mounted above the bottom cover plate of the recorder as is the power supply and lamp regulator board containing the regulation and error detection circuitry.

4. CHART FACILITIES (FIG 5.1)

4.1 Grid

4.1.1 The longitudinal reference grid is produced by the light which passes through the slots in a metal strip positioned across the full width of the paper. Light gathered from the u.v.lamp is deflected through the grid slots by 2 mirrors. The slotted grid strip is located directly behind the cassette release flap and paper roller.

4.1.2 *Grid Intensity.* The GRID lever on the front panel controls the grid shutter which varies the intensity of the grid lines. The shutter is a linear aperture in the form of a rod with a longitudinal slot through which the light passes for the grid lines. Rotating the rod,therefore, progressively 'opens' or 'closes' the slot. The rod is located behind and below the control panel.

4.2 Time Lines

4.2.1 Horizontal timing lines can be printed on the recording paper at selected intervals. A line is printed each time the xenon stroboscopic tube flashes. The time interval can be selected on the front control panel or by remote control.

4.2.2 The trigger pulse for the xenon flashtube is derived from a 500 Hz oscillator on the control logic board behind the control panel.The oscillator output is successively divided to produce trigger pulses over a range of different rates. The selection circuitry is also on the control logic board.

4.2.3 The flashtube,its ignition coil and the capacitor which stores the charge which powers the flash are located on the timer board behind the paper cassette. The flash and the recharging of the capacitor are controlled by opposite phases of the trigger pulse via pulse transformers on the power supply and lamp regulator board.

4.3 Event Marker

4.3.1 The event marker unit on the left side of the galvanometer block can be activated either locally at the control panel or remotely in order to mark events in the signal traces. When a current pulse passes through the unit,its mirror is deflected temporarily and makes a blip in the event marker line. The event marker unit can be rotated in order to cause the event marker to appear at any horizontal position on the chart.

4.4 Reference Traces

Two adjustable static mirrors which resemble galvanometers can be supplied and are inserted in the holes at each end of the row of galvanometers in the block. The mirrors produce longitudinal reference lines on the chart.

4.5 Trace Identification

4.5.1 Trace (channel) identification is provided by interrupting the light to each galvanometer in turn and in synchronism with the printing of the channel numbers along the left-hand edge of the paper. The galvanometer light path is interrupted by trace interrupt pins on a moving belt. The channel numbers are printed by light passing through figures cut in a disc which is rotated in synchronism with the trace interrupt belt.

4.5.2 The trace interrupt belt runs across in front of the galvanometer block. The trace numbering disc is located at the left end of the belt.

4.6 Trace Intensity

The TRACE lever controls the trace shutter which varies the intensity of all images on the recording paper with the exception of the grid. The trace shutter is located in front of,and operates in the same way as,the grid shutter.

4.7 Record Period

4.7.1 The recorder can be set to record continuously or to stop automatically after 0.5s,1s or 2s. The selection can be made at the front panel or remotely. The chart drive is stopped after the selected period via the start/stop control on the control logic board.

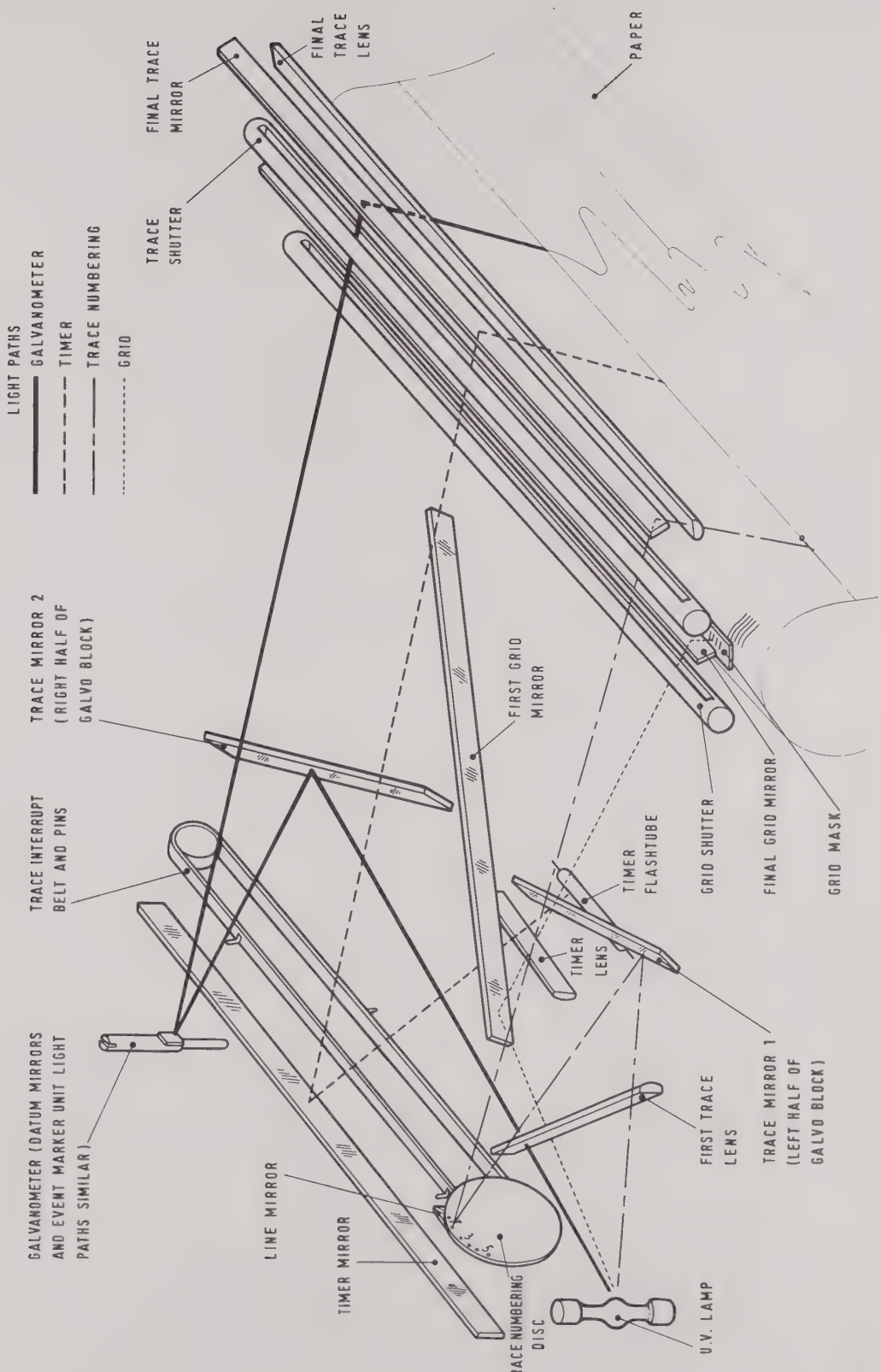


FIG 5.1 OPTICAL SYSTEM SCHEMATIC

5. DRIVE AND BRAKE SYSTEM

5.1 The drive unit consists of a d.c.motor coupled to a separate tacho via a fixed gear ratio. The motor drives the paper drive roller and the trace numbering mechanism via toothed rubber belts. Chart speed can be selected either locally or remotely,the selection circuitry being located on the control logic board.

5.2 Servo control of motor speed is performed by circuitry on the servo board which is mounted inside the right side cover plate of the recorder. The tacho produces a velocity feedback which is used to maintain the chart drive within 3% of the selected speed.

5.3 Drive error circuitry on the servo board causes an l.e.d. indicator on the front panel to be illuminated and stops the chart drive should a drive overload occur. The start/stop control is on the control logic board.

5.4 A solenoid-activated brake on the paper spool is pulse operated each time the drive is stopped in order to prevent paper spillage.

6. GALVANOMETER MAGNET BLOCK

6.1 The galvanometer magnet block consists of permanent magnet blocks furnished with high grade pole pieces into which the galvanometers are inserted. The inserts are plastic collars to insulate the galvanometers from the block and from each other. Connection is made by a pair of spring-loaded plated contacts for each galvanometer.

6.2 The SE 6300 is fitted with either a 12-channel or a 24-channel block insulated to withstand 500 V d.c. between adjacent galvanometers or between galvanometers and the block.

6.3 The galvanometer magnet block is bolted into the centre compartment of the recorder. It carries the timer mirror across the front and a mirror type event marker on the left hand side. The block also has a pair of thermostatically controlled heaters to keep the temperature of the block constant ensuring that the viscosity of the silicon fluid in the high frequency galvanometers remains constant hence maintaining the damping coefficient.

7. GALVANOMETERS

7.1 The specifications of the SE Labs range of galvanometers are given in SECTION 1 of this manual.

7.2 Fig 5.2 shows the construction of an SE Labs galvanometer. It embodies a moving coil system suspended by a torsion strip,with a surface-aluminised mirror attached,and mounted in a cylindrical frame. This frame is housed in a cylindrical pencil container 2.7 in.(69mm) long by 0.125 in.(3mm) diameter,with a lens opposite the mirror to focus the light beam projected onto it.

7.3 There are two groups of galvanometers which differ in their damping requirements.

(a) Low Frequency. Galvanometers with a natural frequency less than 500 Hz should be connected to a source in such a way that a specified damping resistance is achieved.

(b) High Frequency. Galvanometers with a natural frequency greater than 500 Hz are damped internally with a silicon fluid of viscosity suited to the type. Note however that A1000 and A1600 types require resistive damping as well.

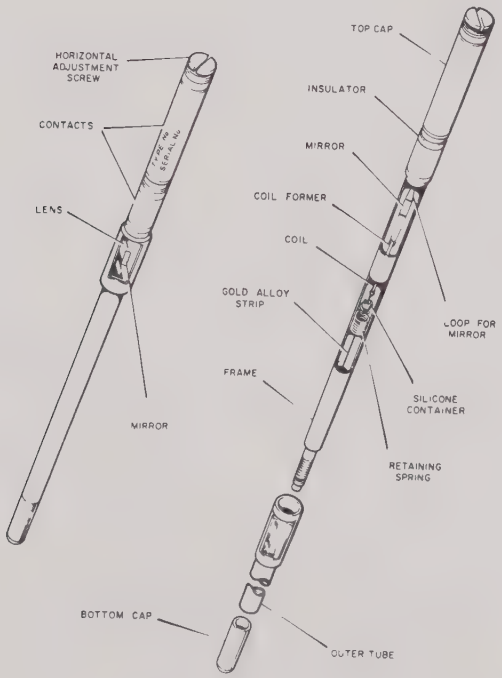


FIG 5.2 GALVANOMETER CONSTRUCTION

7.4 Information on the calculation of the damping resistor will be found in SECTION 3.

8. REMOTE CONTROL

8.1 Remote Control Socket

8.1.1 This is a 25-way Cannon D socket which permits remote control of timing line interval,chart speed,record period,external timing line trigger,event marker and recorder start/stop. The connections are given in SECTION 3 and the operational requirements are described in SECTION 4.

8.2 Variable Speed Socket

8.2.1 This is a 5-way DIN socket for the input of an external chart speed control voltage. The connections are given in SECTION 3 and the operational requirements are described in SECTION 4.

8.3 Test Socket

8.3.1 This is a 5-way DIN socket at which the motor current can be measured. The socket contains connections to each end of the 0.5Ω resistor which is in series with the motor. The voltage drop across the resistor can be measured and the motor current calculated therefrom.

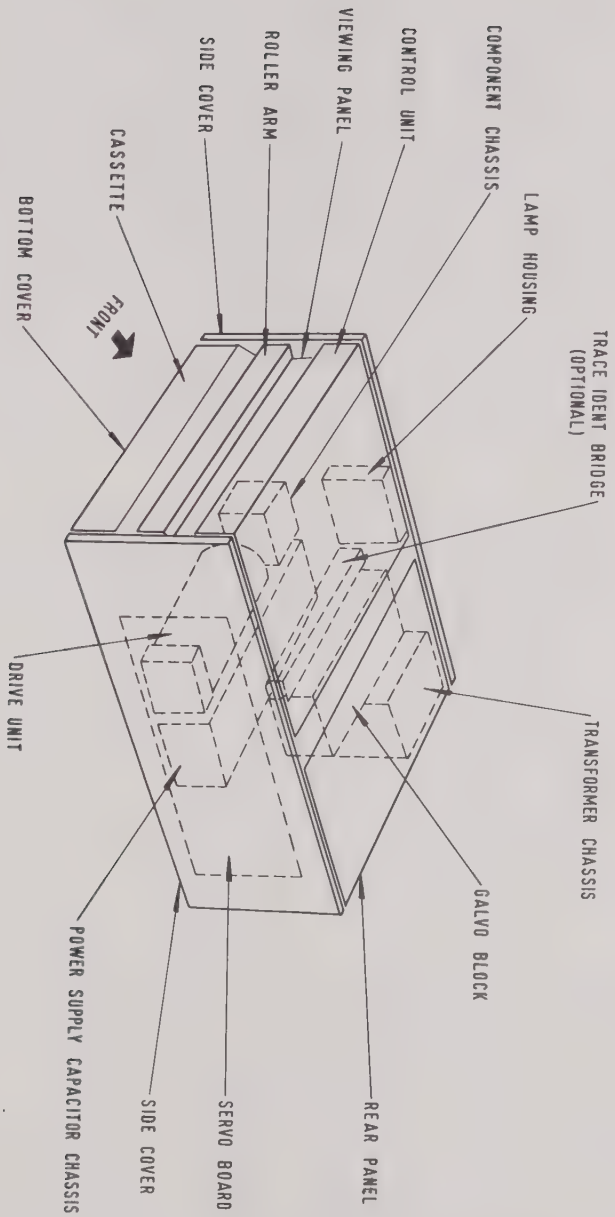


FIG 5.3 LOCATION OF MAJOR SUB-ASSEMBLIES

SECTION 6

CIRCUIT DESCRIPTIONS

Sub-Section	LIST OF CONTENTS	Page No.
1	Power Supply System	6.1
	Mains Distribution	6.1
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3	Servo Drive Control and Brake System	6.6
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1. POWER SUPPLY SYSTEM

1.1 Mains Distribution

1.1.1 The mains enters the recorder via a flying lead which is connected at the rear panel via PL1. The live and neutral leads are connected to the MAINS On/Off switch S1 on the front panel,the live lead via fuse FS1 on the rear panel. From S1 the switched mains is supplied to the mains transformer T1 via SKT 14. T1 is located in the rear compartment of the recorder. The power supply circuit is shown in fig 8 in SECTION 9 and the component layouts in figs 3,4 and 7.

1.1.2 Mains transformer T1 has 2 primary windings which are linked either in series or in parallel depending upon the mains voltage. The linking is done by the converter plate on the rear panel (S2) whichever mains voltage is used,115V a.c. is supplied to the magnet block heaters.

NOTE: Mains fuses - 3.15A fast blow (230V) or 6.3A fast blow (115V)

1.2 D.C. Supplies

1.2.1 The transformer has 6 secondary windings whose outputs are rectified, smoothed and in 3 cases regulated to provide the various d.c. supplies used throughout the recorder. The power supply components are found in 3 locations: in the transformer compartment at the rear and on the power supply and lamp regulator board and the capacitor chassis both of which are above the bottom cover plate of the recorder.

1.2.2 The secondary winding at transformer leads 10 and 16 after being fused at 3.15A (slow blow) by FS2 on the rear panel is rectified by D1 and smoothed by C1 to produce the -120V supply to the drive motor and brake mechanisms. D1 and C1 are located in the transformer compartment.

1.2.3 The secondary winding at leads 11 and 17 is fused at 500mA (fast blow) by FS4,rectified by D2 and smoothed by C2 and C3 to produce the +505V for the timer flashtube h.t. supply and the u.v. lamp ignition circuit. FS4 and D2 are found on the power supply and lamp regulator board and the capacitors are on the capacitor chassis.

1.2.4 The secondary winding at leads 9 and 15 is fused at 3.15A (slow blow) by FS3 on the rear panel,rectified by D3 and smoothed by C4 to produce +60V for the u.v.lamp. D3 and C4 are located on the capacitor chassis.

1.2.5 The secondary winding at leads 8 and 14 is rectified by D4,smoothed by C5 and shunt-regulated by Zener diode D7 to produce +30V for the event marker unit. A +24V regulated servo reference is also derived from this source on the servo board. C5 is mounted on the capacitor chassis and D4 and D7 on the power supply and lamp regulator board.

1.2.6 The secondary winding at leads 7 and 13 is rectified by D5,smoothed by C6 and regulated by linear regulator IC1 and series pass transistor TR1 to produce the +10V supply. This supply is accurately set on test for use as a reference voltage in some of the recorder circuits. The +10V supply is further series regulated by IC3 to +5V to supply the CMOS circuitry. C6 and TR1 are found on the capacitor chassis and D5,IC1 and IC3 are on the power supply and lamp regulator board.

1.2.7 The seconary winding at leads 6 and 12 is rectified by D6,smoothed by C7 and regulated by linear regulator IC2 and series pass transistor TR2 to produce the -10V supply. This supply is accurately set on test for use as a reference voltage in some of the recorder circuits. C7 is located on the capacitor chassis and the remaining components are on the power supply and lamp regulator board.

2. U.V.LAMP SYSTEM (FIGS 6.1 & 6.2)

2.1 Introduction

2.1.1 The u.v. lamp system consists of:

(a) the u.v.lamp mounted in the metal box inside the left side cover plate of the recorder,

(b) the drive components and ignition transformer on the component chassis above the bottom cover plate of the recorder and beneath the u.v.lamp box and

(c) the lamp regulation,ignition and error detection circuitry on the power supply and lamp regulator board also above the bottom cover plate.

2.1.2 The complete circuit of the system is shown in fig.8 and the component layouts in figs.5 and 7 in SECTION 8.

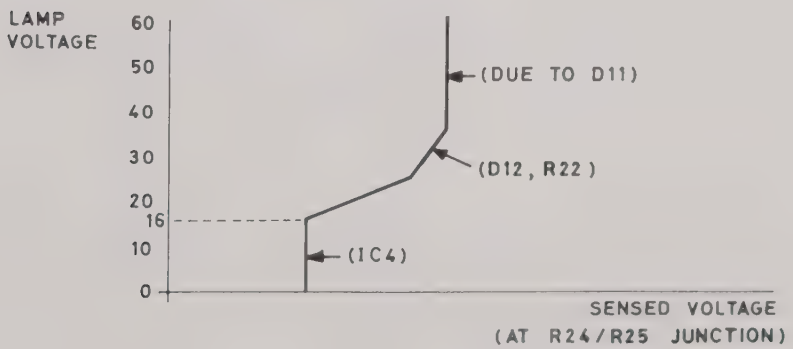
2.2 U.V. Lamp Regulation

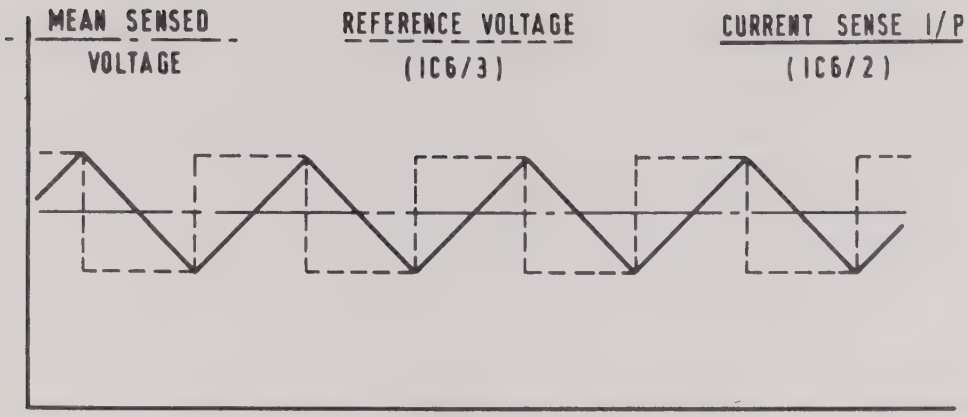
2.2.1 The + 60V d.c. supply is connected to the positive (bottom) terminal of the u.v.lamp via SKT 16/1 and SKT 16/2 to the component chassis. The negative return from the top of the lamp passes through the secondary of ignition transformer T4,current sense resistor R57, smoothing choke L2 and Darlington power transistor TR6 to 0V,on the power supply and lamp regulator board via SKT 16/8 and SKT 16/9. The +60V d.c. supply is floating with respect to the control supplies in order for the circuit to be able to cope with different lamp voltages.

2.2.2 In order to obtain maximum lamp life,it must be supplied from a d.c. source with a constant-power characteristic. During the useful working like of the lamp,its working terminal voltage varies from 16V to 30V. In order to maintain the lamp power at 100W,therefore,currents from 6.25A to 3.33A must be supplied. There is also the requirement for an open circuit voltage of at least +45V to ensure reliable ignition of the lamp. The above requirements of high open circuit voltage,low working voltage and high current would lead to high dissipation in the power stage if a linear regulator were used. The arrangement used, therefore,is a switching power regulator.

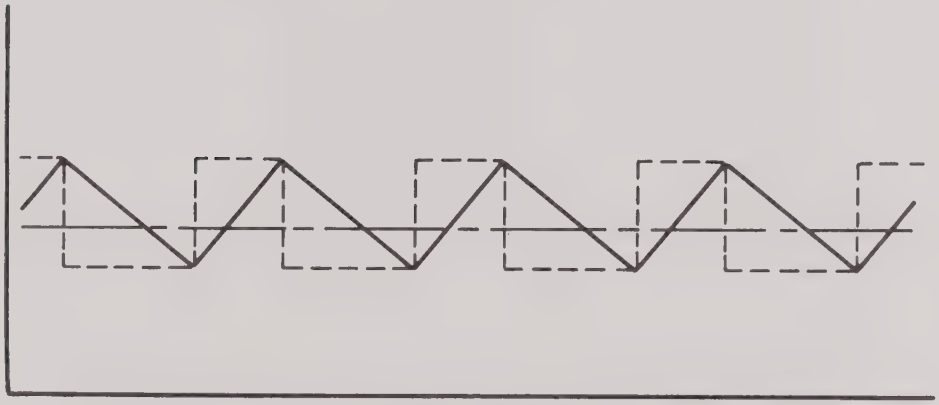
2.2.3 After the lamp is ignited,the current in L2 rises at the rate L (di/dt). Comparator IC6 switches TR6 off (via TR4 and TR5) when the output from current sense amplifier IC5 begins to exceed the voltage reference provided by D11,D12,R22 and R23. IC4 is used in a current limit clamp circuit,the limit being set via RV3. Due to the hysteresis feedback (R34 and C16) around the comparator,the current has to ramp down approximately 2A before TR6 is switched on again. C20 provides a smoothed average voltage across the lamp.

2.2.4 The mean level about which the lamp current swings is determined by the voltage sensed at R57 which is proportional to the lamp current. A straight-line approximation of the sensed voltage versus lamp voltage curve is shown below.

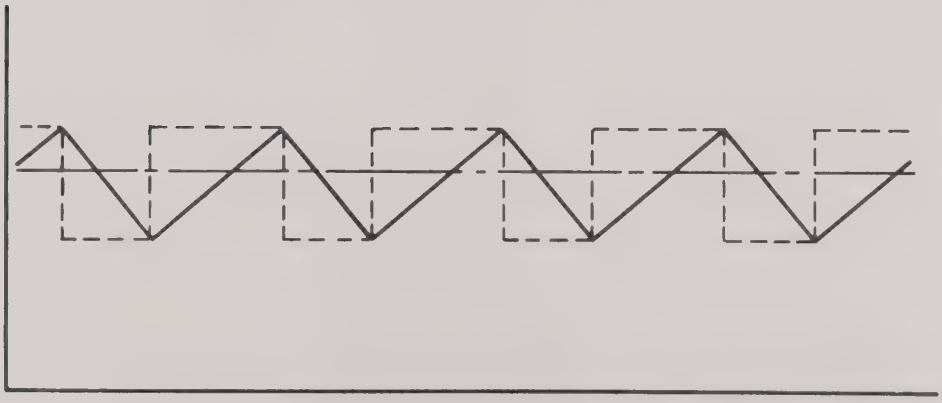




NORMAL OPERATION



LOW MAINS VOLTAGE



LOW LAMP VOLTAGE

FIG 6.1 COMPARATOR INPUT WAVEFORMS

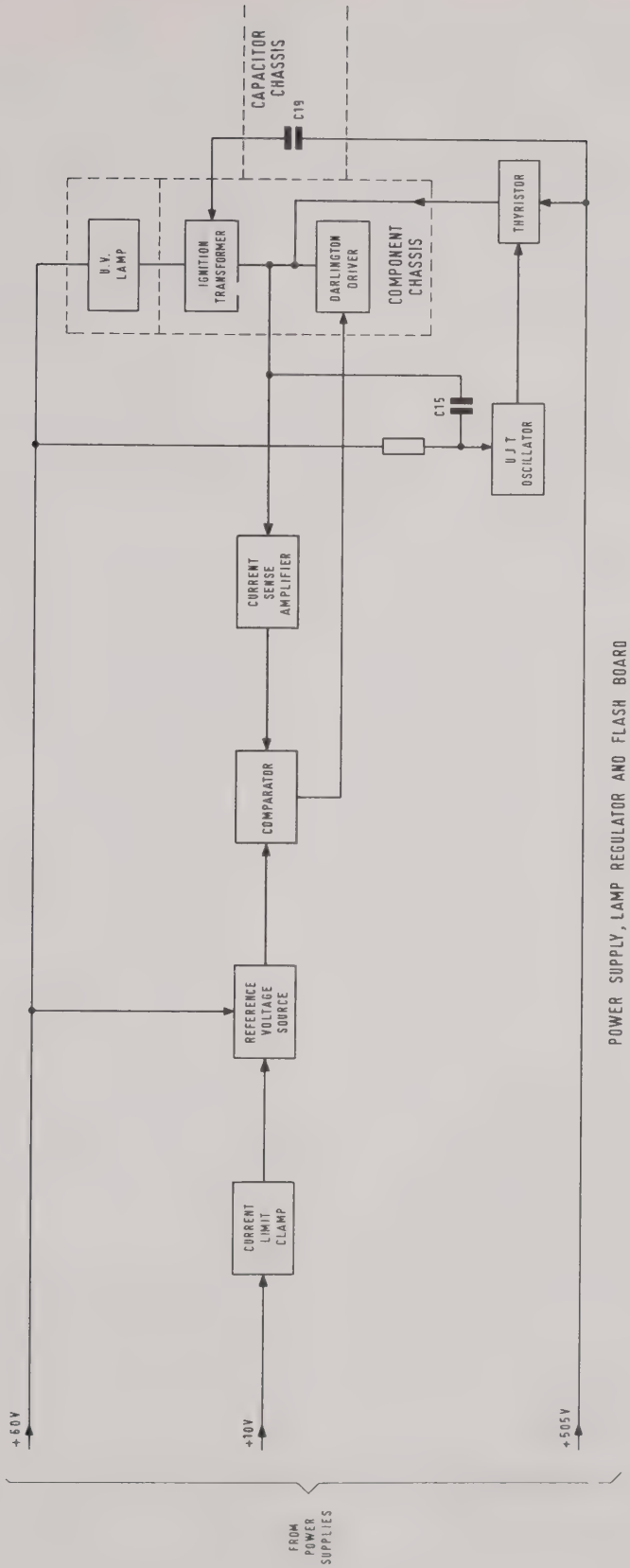


FIG 6.2 U.V. LAMP REGULATION AND IGNITION

The bottom portion of the characteristic is arranged to provide a current limit. Because the circuit never senses a voltage indicative of a lamp voltage lower than 16V,it never tries to deliver a current higher than 6.25A. The middle portion of the characteristic at the top where the lamp voltage rises without any increase in sensed voltage prevents the high lamp ignition voltage turning off the switching stages before the lamp ignites and begins drawing current.

2.2.5 RV4 is adjusted to set up the nominal 100 watt running conditions of the lamp. This setting up is normally done at the factory with a precision load to simulate the nominal conditions of a lamp. The circuit is intended to maintain the power of the lamp reasonably constant until it is worn out due to erosion of the electrodes,and should not require readjustment when a new lamp is subsequently fitted.

2.2.6 After ignition,until the u.v.lamp has stabilised,or should it be extinguished for some reason,the LAMP ERROR signal is produced. The above situations result in an under-voltage or over-voltage on the positive lamp rail,respectively. Either condition is detected by current differencing amplifiers IC4,using the +10V supply as a reference. The resulting negative-going output at IC4/4 or IC4/9 produces a positive-going LAMP ERROR signal at PL3/1. This causes the LAMP ERROR l.e.d. indicator on the front control panel to light and the chart drive to be inhibited via the control logic board.

2.3 U.V. Lamp Ignition

2.3.1 CSR2 is a programmable unijunction transistor which is set to form a low frequency oscillator. C15 charges up through R26 from the voltage across the lamp prior to ignition. When the firing point of the unijunction is reached ,the unijunction injects a fast pulse into the gate of a thyristor CSR1. The thyristor is triggered ON and C19 which has charged up to the +505V supply is discharged through the primary of step-up trigger transformer T4,whose secondary applies the necessary series high voltage to strike the u.v.lamp.

2.3.2 If the u.v.lamp fails to strike,C15 and C19 recharge and the firing cycle is repeated until the lamp does ignite. The voltage across the lamp then falls and the unijunction oscillator ceases to function.

2.3.3 Inductor L1 ensures that the SCR turns off by causing the voltage across T4 to swing sharply negative for a short duration and increases the effective voltage injected into the lamp circuit.

3. SERVO DRIVE CONTROL AND BRAKE SYSTEMS (FIG 6.3)

3.1 Introduction

3.1.1 The servo control system electronics is contained on a printed circuit board with a small chassis assembly at one end for components requiring a heat sink. The board is located inside the right side cover plate of the recorder. The drive unit is a motor/tachometer assembly mounted in

the bottom compartment of the recorder. A belt/pulley system connects the paper drive roller to the motor. The brake solenoid located behind the left end of the paper cassette is also connected to the servo board. The complete circuit is shown in fig 10 and the component layout in fig 9 in SECTION 9.

3.2 Servo Control System

3.2.1 *Introduction.* The servo control system consists of a d.c.permanent magnet motor with a tachometer giving velocity feedback which is compared to the motor speed selector reference voltage. The difference,or error, is amplified and used to correct the motor speed. The motor is controlled via a series control transistor operating as a switch mode power stage.

3.2.2 *Speed Selection Reference Voltage.* The +30V d.c. supply enters the servo board at PL4/20. Regulator IC1 produces from this supply a +25V (nominal) d.c. output at PL4/19. This voltage is adjustable by RV1 to suit the particular tacho. The regulated +25V is returned by the switch in the VARIABLE SPEED socket on the rear panel to PL4/18 as the reference potential for the drive speed selector network. This arrangement is to enable the substitution of an external reference potential.

3.2.3. For speed x100 the reference potential is applied directly to the resistor chain R28-R34 by f.e.t. TR6. If speed x100 is not selected, the reference potential is divided by 100 by R16 and R17 and applied to the resistor chain by TR3. The selection of TR3 or TR6 is made via the SPEED SELECTION x100 input from the control logic board. With the input at 0V (for chart speed x100),TR1,TR2 and TR7 are on,allowing TR3 to conduct. With the x100 input at +5V,TR1,TR2 and TR7 are off, so TR4 and TR3 are on and TR6 conducts.

3.2.4 Seven voltages derived from the resistor chain are applied to inputs S1-S7 of analogue switch IC3 (and 0V to S8 for 'stop'). One of the 8 inputs is selected for forwarding to the motor servo circuit by the binary pattern of address bits A0,A1 and A2. The 3 bits A0,A1 and A2 from the control logic board (in TTL levels) are applied to TR5,TR9 and TR11 which drive TR8,TR10 and TR12 respectively,to perform level conversion. Because of the wide voltage range involved in speed selection (0V-25V) it is necessary to provide an elevated reference level for IC3. A +12.5V reference is derived from the +25V reference by IC2. This in turn requires conversion of the logic levels of the IC3 inputs A0,A1 and A2 to +12.5V and +25V.

3.2.5 *Error Amplifier.* The control voltage output from IC3/8 is combined with the tacho output voltage which enters the board at PL23/1 and PL23/3 and the voltage feedback from the motor at input pin 2 of IC4. The error signal resulting from the combination of these 3 parameters is amplified by IC4,the zero output being set by RV2 on pin 3. Feedback for control is provided by the motor/tacho loop. Feedback for stability is via C13 and R65. R54,D6 and D7 prevent saturation in the fully on condition to give a fast recovery from overload on speed changes. The switching frequency is filtered out of the error amplifier circuit by R82,C18 and R55,C7.

3.2.6 *Switching Stages.* The servo control is based on a switching type regulator. The oscillator circuit built around IC7 initially produces a square wave at TP7 and finally a triangular waveform at TP16. The triangular waveform drives one input of gating amplifier IC6,the other input being fed by the error signal from IC4/6. The output at IC6/7, is,therefore,a square wave whose mark-space ratio is varied by the error signal. IC6/7 switches TR14 which controls series regulator power transistor TR15 in the motor circuit. The current path for the motor is from the -120V supply,through L1,TR15 and current sense resistor R92 to the 0V return. The power transistor has a diode-limited drive to prevent saturation and an R-C snubber to prevent second breakdown.

3.2.7 *Drive Error and Motor Current Limit.* The output at IC5/7 is a function of the voltage drop across current sense resistor R92. This output is applied to gating amplifier IC6 to give an overall current limit of 5A. Currents in excess of 2A cause TR13 to conduct. After a 15s-30s delay while C20 charges via TR13 and R76,IC8/2 goes to nearly 0V. This causes the DRIVE ERROR output to the control logic board to go high. The 'stop' condition response from the control logic board resets the DRIVE ERROR circuit via D11. C20 discharges slowly via R90 and therefore 'remembers' if a drive error has been detected recently. Should the fault remain uncorrected and the recorder be restarted within a few seconds,the delay before the drive trips out again is much shorter.

3.3 Start/Stop Control and Brake System

3.3.1 Start/stop control is effected via the START/STOP input (PL18/16) from the control logic board. When the input is high (+5V for 'start'), the IC5/1 output is high and ineffective. When the input is low (0V for 'stop'),IC5/1 pulls the input of gating amplifier IC6 below the level of the error amplifier output via D9. The IC6 output thereby assumes a steady high,switching off TR14,TR15 and the motor and enabling the brake circuit to function as below.

3.3.2 *Brake System.* The d.c. brake solenoid connected to the servo board at PL4/14 and PL4/15 operates a brake on the left end cheek of the paper spool when the recorder is stopped. The solenoid is energised to the -120V d.c. supply upon receipt of the 'stop' condition for only a short period to prevent paper spillage.

3.3.3 TP13 rests at +10V for the duration of an applied 'start' condition and for a period determined by R75,R78,R83 and C17 after a 'stop' signal is received. TP12 goes to +10V when the error amplifier output reaches a sufficiently high level. This occurs when the control loop is broken upon receipt of 'stop'. The signals at the two points are summed at IC9/8 (enabled when the IC6 output goes high). TR16 and TR17 are thereby switched on to energise the brake solenoid only while all the above signals are high.

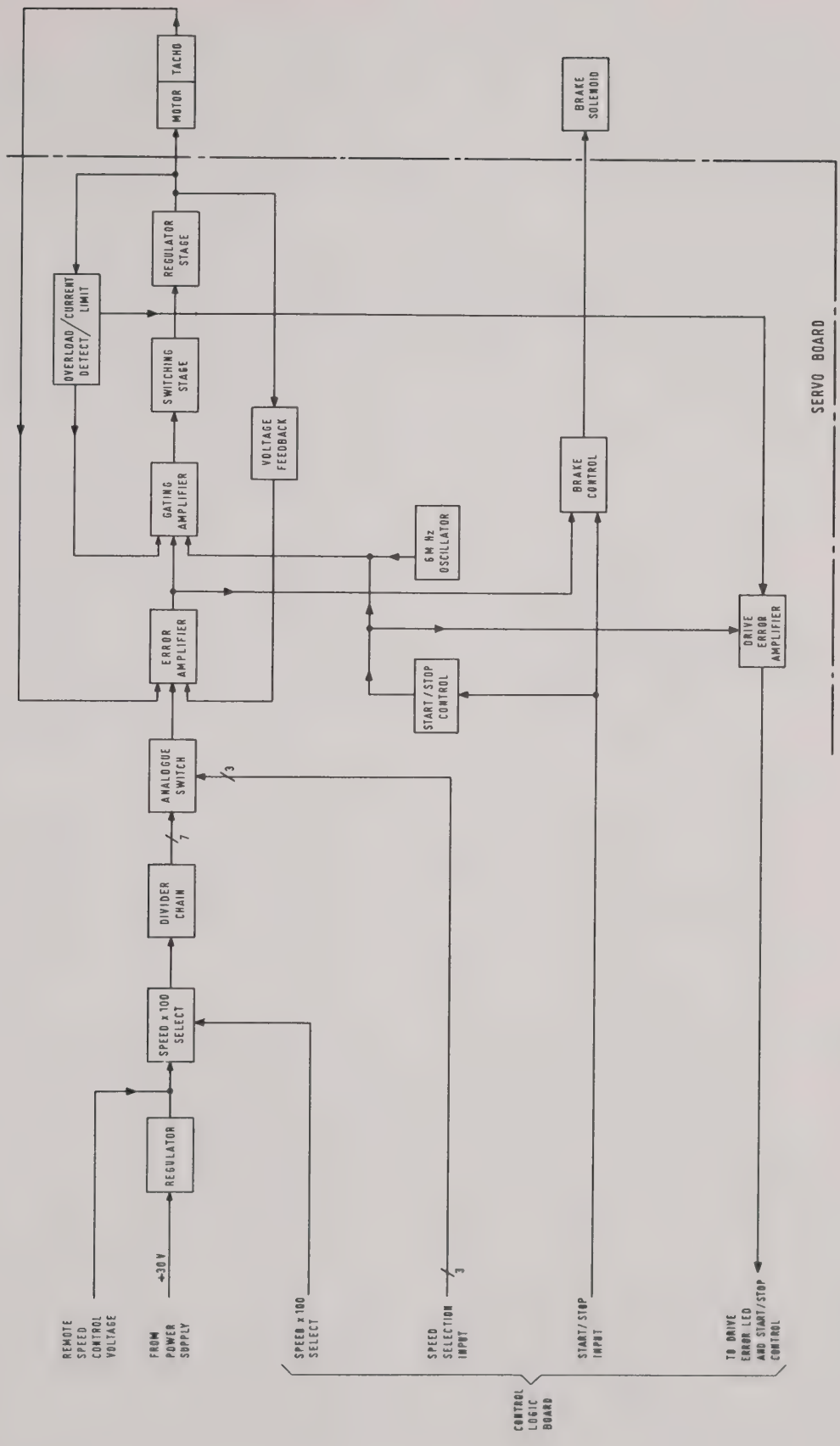


FIG 6.3 SERVO CONTROL AND BRAKE SYSTEM

4. CONTROL UNIT (FIG 6.4)

4.1 Introduction

4.1.1 All front panel controls and remote control inputs interface with the various systems in the recorder via the control logic board whose circuit diagram is shown in fig 12 in SECTION 9. See also fig 14 for system interconnections. The control logic board contains:

(a) recorder start/stop control logic,
(b) selection and drive logic for time flashtube rate,chart speed and record period,
(c) drivers for all front panel indicators and
(d) RS232 compatible line receivers and drivers for remote control inputs and remote indicator outputs,respectively.

4.2 Front Panel Controls and Indicators

4.2.1 *Time Flashtube Rate.* The time flashtube rate is selected by depressing one of the two TIME pushbuttons on the front panel. The selection is changed by a 7-state up/down counter which is clocked once when the pushbutton is depressed and repeatedly by an oscillator with a 0.7s period for as long as the button is held down. The right shift button causes the counter to step up and the left shift button causes it to step down.

4.2.2 The right shift or left shift button,whichever is depressed,causes NOR gate IC2/10 output to go low. This enables the oscillator IC13 by causing IC30/6 to go high. IC2/10 low also enables OR gate IC1/9 to respond to the oscillator output and clock the counter. The low at IC6/8 turns off TR8. The resulting positive pulse at IC13/2 causes the oscillator to output a negative-going pulse to clock the counter via IC1/8. Thereafter,the oscillator output clocks the counter with a negative pulse every 0.7s for as long as the pushbutton is held down.

4.2.3 Since the counter is stepped immediately every time a button is depressed,it is capable of being stepped at a high rate by tapping the button. This facility makes anti-bounce protection necessary on the switch signal. Schmitt triggers IC4/6 and IC4/10 in conjunction with the RC delays at their inputs are provided to suppress any contact bounce which is likely to occur.

4.2.4 Up/down control of the counter is effected by the level of the IC4/6 output to IC3/9 and IC14/2. This is made high by only the right shift button.

4.2.5 Counter outputs from IC8/15,IC8/1 and IC9/15 are taken to the selection gating IC42 where remote or local control of the time lines is selected. The BCD output from IC42 is converted to 1-of-7 form by BCD-to-decimal encoder IC43. The active (high) output of IC43 lights the appropriate TIME l.e.d. via driver IC45 or IC53.

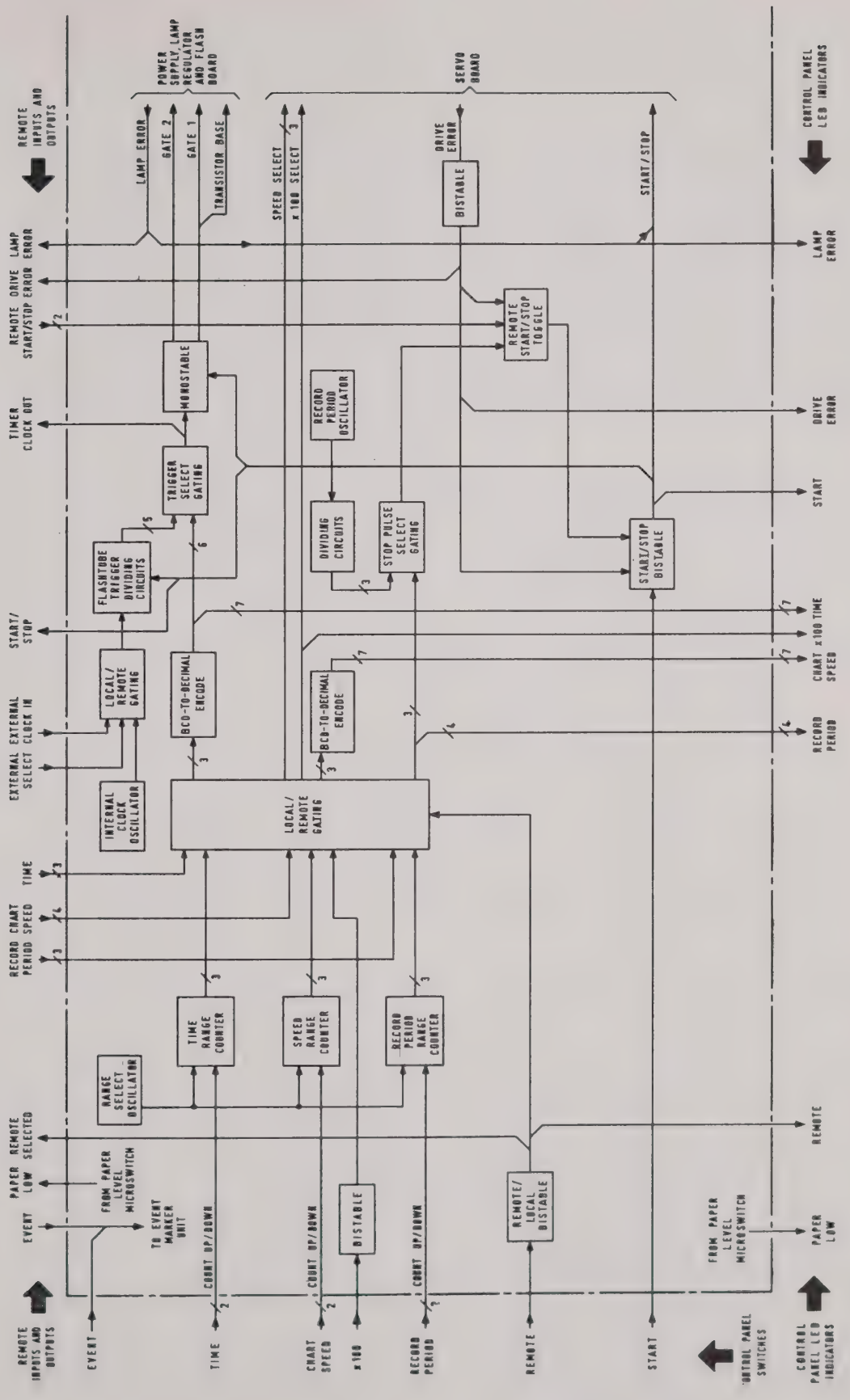


FIG 6.4 CONTROL UNIT

4.2.6 The TIME flashtube trigger is derived from either the 500 Hz RC oscillator IC55 (with buffer TR8) or from a remote source. The trigger source is divided down to give the desired rate of flash. The internal or external trigger is selected at IC47 and applied to IC48 and IC49 which perform a ÷5 function. (The undivided trigger pulse is also available to the flashtube via IC51/3). After division by 5,the pulses from IC49/3 are successively divided by 10 by IC56, IC57,IC60 and IC59,an output being available for selection at each stage. The 1-of-7 output from IC43 selects the required trigger pulse rate at IC51 or IC58. The selected pulses then trigger the monostable IC46 which controls the triggering of the flashtube circuitry on the lamp regulator and timer boards via TR1,TR2 and TR3.

4.2.7 *Chart Speed Selection.* The CHART SPEED right shift and left shift pushbuttons function in the same way as the TIME pushbuttons explained above to start the oscillator (via IC2/4 and IC30/6) which also clocks the 7-state up/down counter for chart speed selection. The chart speed counter is clocked via IC1/10. Up/down control is effected by the level of the IC4/4 output to IC3/11 and IC10/5. This is made high by only the right shift button.

4.2.8 Counter outputs from IC7/1,IC7/15 and IC9/1 are taken to the selection gating IC33 where remote or local control of the chart speed is selected. The BCD output of IC33 is converted to 1-of-7 form by BCD-to-decimal encoder IC34. The active (high) output of IC34 lights the appropriate CHART SPEED l.e.d. via driver IC19 or IC20.

4.2.9 The CHART SPEED x100 pushbutton sets the latch whose Q output is at IC5/1 via the anti-bounce circuitry incorporating Schmitt trigger IC6/4. Depressing the button a second time resets the latch. The output of IC5/1 is applied to remote/local selection gating IC42. When x100 is selected,IC42/10 is high and the x100 l.e.d. indicator is illuminated via driver IC53/13.

4.2.10 The x100 output from IC42 and the 3-bit BCD speed selection output from IC33 are taken to the circuitry on the servo board which controls the motor speed.

4.2.11 *Record Period Selection.* The RECORD PERIOD right shift and left shift pushbuttons function in the same way as the TIME pushbuttons explained above to start the oscillator (via IC2/3 and IC30/6) which also clocks the 4-state up/down counter for record period selection. The record period counter is clocked via IC1/6. Up/down control is effected by the level of the IC4/2 output to IC3/14 and IC37/12. This is made high by only the right shift button.

4.2.12 Counter outputs from IC12/1 and IC12/15 are taken to the selection gating IC31 and IC33 where remote or local control of the record duration is selected. The corresponding output bits from IC31 and IC33 are then applied to the 2-to-4 line decoder IC24. One of the 4 outputs of IC24 becomes high and lights the appropriate RECORD PERIOD l.e.d. indicator via driver IC19. The 3 outputs from IC24/4,IC24/11 and IC24/10 are used to select the period after which the recording is automatically stopped.

4.2.13 *Start/Stop Control.* The recorder is started and stopped by setting and resetting the bistable with output IC27/2. The bistable is triggered via separate inputs by local and remote/automatic controls.

4.2.14 Depressing the START pushbutton on the front panel clocks the bistable, causing it to set and reset alternately. The $\overline{Q}$ output becomes low when the bistable is set. This causes the START l.e.d. indicator to be illuminated via driver IC53/9 and sends a high START signal to the servo board via IC2/11. The low $\overline{Q}$ output also enables the ÷10 circuits IC56,IC57,IC60 and IC59 to produce their various time flashtube trigger pulse rates. IC23/4 high enables IC50 to pass the selected pulses to trigger the monostable IC46 only after the recorder is started. IC23/4 high also starts the record period oscillator.

4.2.15 The record period automatic stop signal is derived from the 0.5s period oscillator IC22. Dividing circuits produce alternative stop signals at 1s and 2s after starting. The oscillator output is divided by 2 and by 4 by the bistables in IC29. When a record period is selected,the corresponding output from IC24 is high. This enables one of the NAND gates IC30/9,IC30/10 or IC39/1 to respond to its other inputs becoming positive. When this occurs,one of the inputs IC39/10,IC39/11 or IC39/12 becomes low,IC39/13 becomes high and IC38/12 low. IC28/9 is thereby made high,as is IC37/4;the start/stop bistable is reset and the chart drive is stopped.

4.2.16 Since there is a constant low at IC37/8 except when the recorder is started remotely,this circuit functions as a bistable only during remote control operation. Under local control when the automatic stop pulse ends,therefore,IC28/9 reverts to low. This removes the reset condition from the start/stop bistable,enabling the drive to be restarted by depressing the START button. When 'continuous' recording is selected,all 3 outputs from IC24 are low;IC30 and IC39 inhibit the automatic stop signal.

4.2.17 *Event Marker.* Depressing the EVENT pushbutton on the front control panel causes a low to appear at edge connectors 29 and 30. This causes the event marker mirror to be deflected.

4.2.18 *Lamp Error.* A high LAMP ERROR input causes a low START/STOP signal to the servo board via IC2/11 to stop the chart drive. The LAMP ERROR l.e.d. indicator is illuminated by TR5.

4.2.19 *Drive Error.* A high DRIVE ERROR input resets the bistable whose $\overline{Q}$ output at IC27/14 stops the chart drive via the same circuitry through which the record period control functions. With the record period inputs at IC39/10,IC30/11 and IC39/12 high (normal),IC23/10 going low in response to a drive error causes IC39/13 to go high. IC28/9 becomes high and bistable IC27/2 is reset to stop the chart drive. The DRIVE ERROR l.e.d. indicator is illuminated via driver IC53/2.

4.2.20 When the START/STOP signal to the servo board becomes low,the DRIVE ERROR signal also becomes low. This enables the start switch to set the IC27/14 bistable and remove the drive error condition from the start/stop control. Depressing the START button,therefore,restarts the recorder.

4.2.21 *Paper Low.* A low input from the paper level microswitch lights the PAPER LOW l.e.d. indicator via driver IC53.

4.2.22 *Power-Up Initial Conditions.* The initialisation circuit incorporating Schmitt trigger IC6/12 causes the following control positions to be selected automatically upon switching on mains power:

(a) chart drive stopped,
(b) 'local' control,
(c) TIME 'OFF'
(d) CHART SPEED 0.5mm/s,
(e) RECORD PERIOD 'CONT'

C41 discharaged maintains IC6/13 low for a short time after power switch-on. The resulting high at IC6/12 ensures that the chart drive is switched off,i.e. IC27/2 reset via IC38/15 low,IC28/9 high,IC38/6 low and IC37/4 high. After C41 charges sufficiently to allow IC6/12 to switch,the above conditions reverse and the start/stop control bistable IC27/2 can now be set by either local or remote control. (Note that although the bistable can be set,the chart drive will not start until the u.v.lamp has properly warmed up and the LAMP ERROR is terminated).

4.2.23 IC6/12 high also resets the timer,chart speed and record period counters to 'OFF','0.5mm/s',and 'CONT',respectively. 'Local' control is selected via IC5/9.

4.3 Remote Control

4.3.1 *Remote Switch.* Depressing the REMOTE pushbutton switch clocks the bistable with its Q output at IC5/15,causing it to set and reset alternately. The bistable is set (Q output high) for local control and reset for remote control. The bistable is set automatically for local control by the high at IC6/12 upon power switch-on

4.3.1 When the bistable is set for local control,IC5/15 high enables the gates in IC42,IC33 and IC31 which pass the local control signals for time chart speed and record period selection. Only the remote control inputs corresponding to the above are inhibited,this being done via inverter IC35/12. Resetting the bistable for remote control enables the remote control inputs and inhibits the above local signals. When reset for remote control,IC5/14 high inhibits OR gates IC1/9,IC1/10 and IC1/6 to prevent the time,chart speed and record period counters being clocked. This causes the counters to remember the last selections made locally until the recorder is again switched to local control.

4.3.3 *Remote Control Inputs.* IC32,IC36,IC41 and IC54 are RS232 compatible line receivers for the remote control inputs listed in SECTION 3 of this manual. Over short cable runs (less than 10 metres) TTL level signals can be used.

4.3.4 *Remote Start/Stop Control.* Remote START and STOP inputs (low active) at IC36/4 and IC36/13, respectively, set and reset the start/stop bistable (with its $\overline{Q}$ output at IC27/2) which functions as explained above. The remainder of the start/stop control circuitry operates differently under remote control. With a low at the START input, the resulting high at IC37/8 enables the interconnected gates of IC37 and IC28 to act as a toggle. Initially IC37/10 is high and IC28/9 low. When a record period automatic stop signal occurs, the low at IC28/2 sets the toggle, making IC37/10 low and IC28/9 high. The start/stop bistable is thereby reset via IC38/6 and IC37/4. The IC37-IC28 toggle remains set until the low START condition is removed from the remote control input. The toggle is then reset by the low at IC37/8. The resulting low at IC28/9 removes the reset from the start/stop bistable, enabling it to be set again when the START signal is reapplied.

4.3.5 When a drive error occurs and resets the drive error bistable, the toggle is set by the low at IC28/2 via IC23/10, IC39/13 and IC38/12. The start/stop bistable is reset to stop the chart drive as above. The drive error condition can be reset only by the local START switch on the front control panel. This sets the drive error bistable which removes the set signal from the IC37-IC28 toggle. When the remote START signal is removed, the toggle is reset by the low at IC37/8 and removes the reset from the start/stop bistable. The chart drive can now be restarted either locally or remotely. If the remote START signal is removed before the local START button is depressed, the chart drive restarts when the button is depressed.

4.3.6 *Remote Outputs.* IC21, IC40 and TR6 are RS232 compatible line drivers for the remote outputs listed in SECTION 3 of this manual.

5. TIMER FLASHTUBE (FIGS 6.5 & 6.6)

5.1 Introduction

5.1.1 The timer flashtube circuit shown in fig 6.5 consists basically of a Xenon flashtube, a capacitor and a trigger circuit to trigger the flash. Monostable IC46 controls TR1, TR2 and TR3 on the control logic board to produce the gating pulses which control the flashtube circuit.

5.2 Circuit Operation

5.2.1 When the monostable is triggered, the Q output becomes high and $\overline{Q}$ low for 230 µs. TR1 is thereby turned on and TR3 off. The GATE 2 negative-going output from TR1 is applied to the primary of pulse transformer T3 on the power supply and lamp regulator board. Since the positive-going end of the T3 secondary is connected to the CSR1 gate, CSR1 now conducts. CSR1 completes the primary circuit of ignition coil T1 which produces a 4kV pulse to cause the flashtube LP1 to strike. In flashing LP1 depletes the charge stored on C2.

5.2.2 TR3 on the control logic board going off allows TR3 on the power supply and lamp regulator board to conduct after a 100 µs delay while C25 charges via R74. After the delay TR3 shunts the primary circuit of T1 to prevent ringing in the ignition coil circuit.

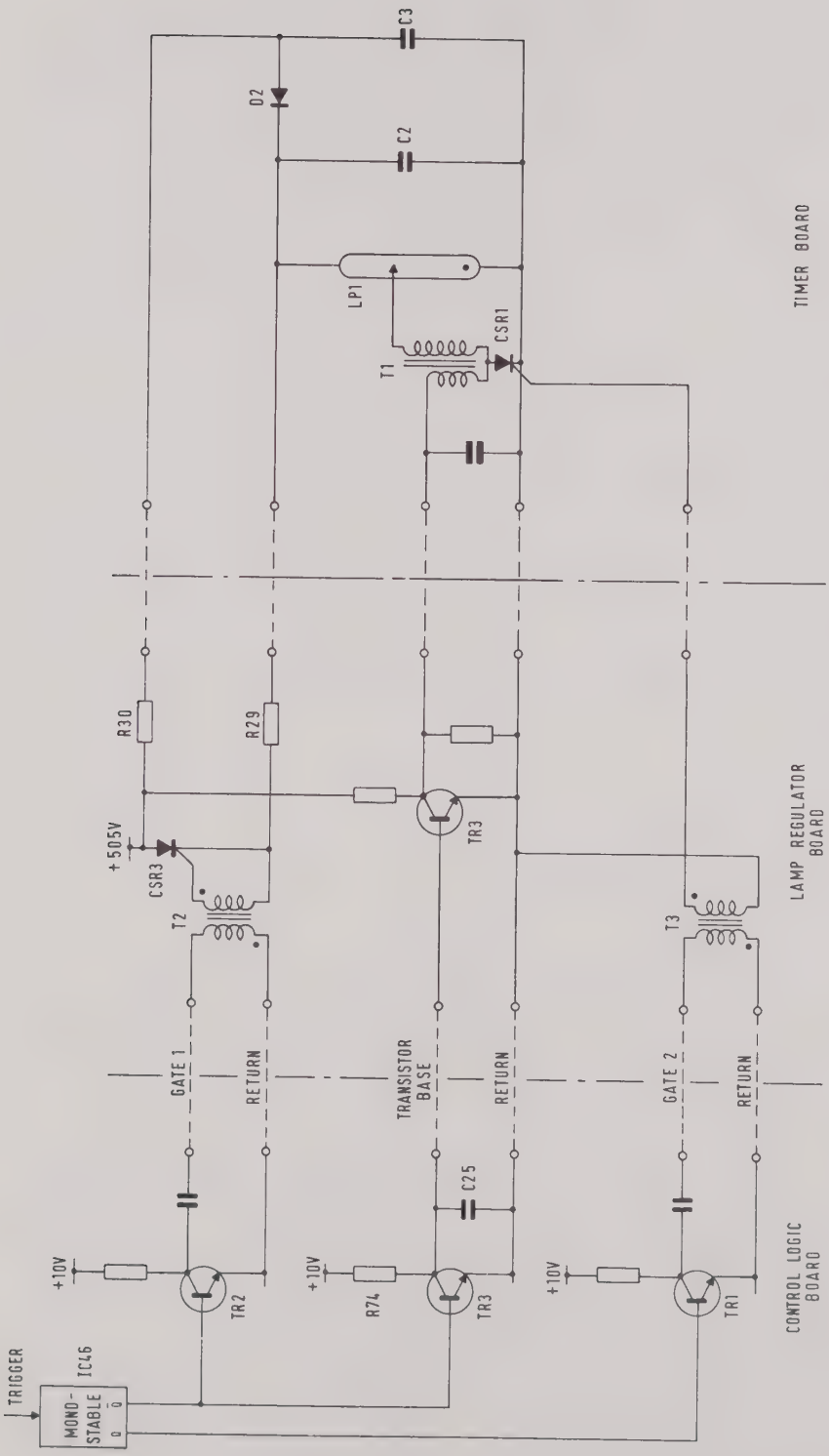


FIG 6.5 TIMER FLASHTUBE - SIMPLIFIED CIRCUIT DIAGRAM

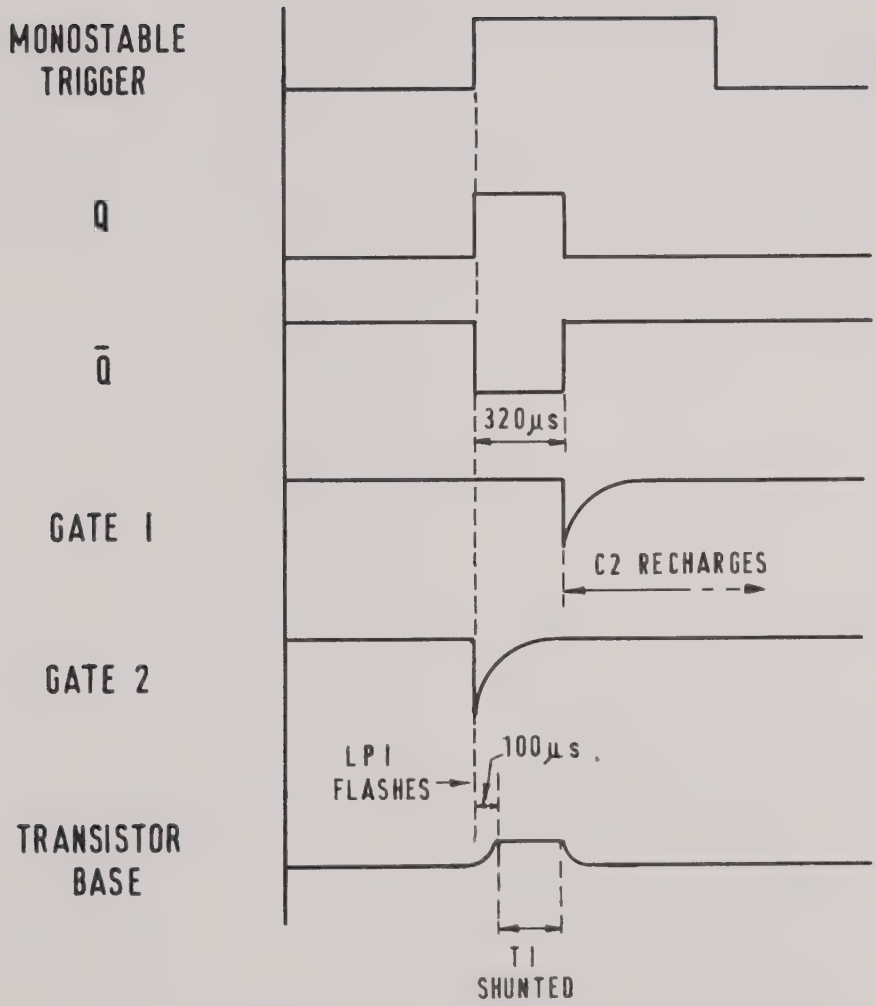


FIG 6.6 FLASHTUBE TRIGGER - TIMING DIAGRAM

5.2.3 When the monostable reverts to its stable state (Q low and $\overline{Q}$ high), TR1 is turned off,TR2 and TR3 on. The GATE 1 output from TR2 is applied to pulse transformer T2 which produces a positive-going pulse to switch on CSR3. CSR3 completes the charging circuit for C2 on the timer board via R29. C2 then recharges to the +505V supply in preparation for the next flash.

5.2.4 At slow flash rates (usually used with corresponding slow chart speeds) slight light fogging of the recording paper makes a stronger flash necessary for distinct time lines. To provide this compensation a second storage capacitor C3 is included on the timer board. Between flashes C3 recharges via R30 which gives it a longer time constant than C2. C3,therefore,becomes effective and increases the power of the flash only at low flash rates. D2 prevents C3 recharging quickly in parallel with C2 while allowing both capacitors to discharge through the flashtube simultaneously.

SECTION 7

MAINTENANCE AND SETTING-UP ADJUSTMENTS

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1. SAFETY PRECAUTIONS

1.1 This section contains instructions for operational maintenance and disassembly for access to sub-assemblies. The disassembly information is intended for use only by competent service engineer/technician familiar with this type of equipment and trained in its use.

1.2 If in any doubt the Company or its Agent must be contacted. The adddresses of the U.K. depots are given in SECTION 8 para 1.1 of this manual.

1.3 The various warnings and precautions given in this manual must be observed.

WARNING

Before removing instrument covers
and/or removing plug-in units,
disconnect mains input lead and
allow time for reservoir capacitors
to discharge.

1.4 When the recorder is in operation there is 505V at the timer board edge connector pins. The flashtube has several kV applied to its metallised electrode.

1.5 The u.v.lamp strike circuit uses the +505V d.c. supply and applies an ignition voltage of several kV in series with the lamp.

WARNING

The u.v.lamp operates under high temperature and pressure and its light is injurious to the eyes.

The lamp must not be directly viewed unless special protective spectacles are worn,(Part No. XS29042 available from S.E.Labs). NEVER operate the lamp with the lamp housing removed,even when wearing the protective spectacles. As a precaution therefore,always remove the mains input connector before removing the lamp housing. The lamp must be allowed to cool before handling.

If the bulb is accidentally touched or otherwise becomes dirty,it should be cleaned with a soft fluff-free cloth moistened with alcohol.

1.6 The u.v.lamp must only be operated when the recorder is resting in its normal position,i.e. not on its side or inverted.

1.7 Signal inputs to the galvanometers may be at levels as high as 500V d.c. It is therefore advisable to disconnect these inputs before opening the recorder top cover.

1.8 When making adjustments inside the machine,care should be taken not to touch or otherwise contaminate the optical surfaces.

2. OPERATIONAL MAINTENANCE

2.1 Lubrication

2.1.1 At intervals of approximately 2000 running hours,it is recommended that the drive roller and pinch roller bearings be lightly oiled with a lubricant having a viscosity the equivalent of S.A.E.30.

CAUTION

Care must be taken to ensure that the lubricant does not contaminate rubber rollers and belts,or optical surfaces

2.2 Optical System

2.2.1 The surfaces of all mirrors and lenses of the optical system must be treated with care and kept free from dust,oil and grease. For maximum protection all mirror surfaces are hard coated.

2.2.2 Grease and oil are best removed by the use of a soft non-fibrous tissue-paper and alcohol which leaves no residue on drying. Care must be taken not to exert too much pressure during this operation. Dust is best removed with a camel-hair brush.

2.3 Magnet Block

2.3.1 It is important to prevent magnetically attracted particles lodging in the pole pieces as they interfere with the flux distribution of the magnet system. Any particles which have been attracted should be removed by using a piece of adhesive tape or a pair of non-ferrous tweezers.

2.4 U.V. Lamp Renewal

The lamp is a 100-watt compact arc mercury type and is mounted in the left hand compartment of the recorder. To renew proceed as follows:

(a) Switch off recorder,remove mains connector and allow lamp to cool.

(b) Lift rear section of top cover (hinged).

(c) Remove control unit by loosening screws in top rear corners, lifting rear of control unit slightly,sliding control unit forward,unplugging flexible cableform from control logic board and lifting control unit clear.

(d) Remove left side cover (viewed from the front) by removing the 2 screws from inside and 3 hex-head bolts along the bottom rail outside.

(e) The lamp is protected by a small cover held by 3 screws, Loosen the 3 screws,top left,top right and bottom right viewed from the left side;lift the cover upwards and then outwards.

(f) Note the position of the lamps +ve end cap in the top clamp. It is important to position the replacement lamp at the same height.

WARNING

It is emphasised that the bottom of the lamp and the connecting clip are unsupported. Also the lamp reaches a very high temperature and pressure during operation and must be allowed to cool before handling. Never touch the bulb of the lamp,or handle in such a way that the end seals are stressed.

(g) Gently support the bottom of the lamp and release the clamp nut on the top clamp.

(h) Lower the lamp away and release the bottom clamp.

(j) Ensure that the replacement lamp is clean. It can be cleaned using a soft cloth or non-fibrous tissue paper moistened with alcohol.

(k) Fit the bottom clamp to the positive cap (stamped base) of the lamp so that the top edge of the cap is flush with the top edge of the clamp.

(m) Raise the lamp carefully into the upper block and tighten clamp such that the top edge of the -ve cap is at a similar height to the previous lamp. Do not support the bottom end whilst tightening the top clamp to avoid lamp breakage from excessive strain.

(n) Adjust lamp as described below.

2.5 U.V. Lamp Adjustment

WARNING

The u.v.lamp source must not be viewed directly unless protective glasses are worn,as u.v.light is injurious to the eyes. It must not be operated under any circumstances with the lamp housing removed.

(a) Perform steps (b) and (c) above.

(b) Switch on recorder and allow approximately 2 minutes for the u.v.lamp to stabilise.

(c) Set TRACE shutter to max and GRID shutter to min.

(d) The u.v.lamp height adjusting screw protrudes into the central compartment of the recorder just forward of the lamp (see fig 2 in SECTION 9). Using a screwdriver or the galvanometer adjusting tool,position the lamp such that a bright line appears across the faces of the galvanometer lenses.

(e) Check by holding a piece of paper in the cassette that a bright vertical line is obtained for each galvanometer.

(f) Set TRACE and GRID shutter controls as normal and perform a short test run. If traces are unsatisfactory and the galvanometers have previously been correctly set up,rotating the u.v.lamp in its clamp sometimes slightly resets the effective vertical angle of illumination and improves the result.

(g) Replace control unit taking care to ensure that the TRACE and GRID shutter levers locate correctly in their slots in the front panel.

3. ACCESS TO SUB-ASSEMBLIES

3.1 Fig 2 in SECTION 9 is helpful in locating some of the mechanisms referred to in this sub-section. It should be remembered that the u.v. lamp must not be operated with the recorder on its side or inverted.

3.2 Galvanometer Magnet Block

3.2.1 Sufficient access for the adjustment of galvanometers can be obtained simply by lifting the rear hinged section of the top cover.

3.3 Mains Transformer

3.3.1 The mains transformer can be seen after lifting the rear section of the top cover and removing the brown cover (secured by 2 screws) in the rear compartment of the recorder. For clear access to the transformer wiring the rear panel must be removed by removing the 5 screws down each side of the panel. C1 and D1 (for the -120V supply) are also in the mains transformer compartment. Care must be exercised in this area,as high voltages are supplied by the transformer.

3.4 Control Unit

3.4.1 The procedure for removing the control unit is detailed in para 2.4 steps (b) and (c). The top cover can be removed after removing the horizontal fixing screws. The bottom cover of the control unit is held in place by 4 screws,one in each corner.

3.5 Trace Identification Bridge Assembly

3.5.1 The entire trace identification bridge assembly is accessible after removing the control unit,the procedure for which is detailed in para 2.4 steps (b) and (c).

3.6 Optical Components

3.6.1 The first trace lens,timer lens,first trace mirrors,timer mirror and first grid mirror are accessible after removing the control unit as detailed in para 2.4 steps (b) and (c).

3.6.2 The grid shutter,final grid mirror,trace shutter,final trace mirror and lens are located across the front at the top inside the recorder (accessible after removing the control unit).

3.7 Timer Board

3.7.1 The timer board containing the timer flashtube is accessible after removing the control unit as in para 2.4 steps (b) and (c) and the timer board cover (see fig 2 in SECTION 9).

3.8 Mains Switch

3.8.1 The mains switch is behind the left side cover of the recorder. Access can be gained by following the procedure in para 2.4 steps (b),(c) and (d). Remember that the switch terminals are live as long as the recorder is connected to the mains.

3.9 Servo Board

3.9.1 The servo board is behind the right side cover of the recorder. Access can be gained by following the procedure in para 2.4 steps (b),(c) and (d),removing the right side cover instead of the left in step (d). The servo board can be removed from the recorder after removing the 4 screws and 2 nuts (securing the chassis assembly at the rear end of the board).

3.10 Power Supply and Lamp Regulator Board

3.10.1 This board is in the bottom of the recorder and is accessible after removing the bottom cover by removing the 4 corner screws. The board is attached to the capacitor chassis and can be removed by removing the 6 screws securing the board to the chassis.

3.11 Power Supply Capacitor Chassis

3.11.1 This assembly is accessible after removing the power supply and lamp regulator board as detailed in para 3.10.1. The capacitor chassis can be removed (with or without the board attached) by removing the mounting screw in each of the 4 corners.

3.12 Component Chassis

3.12.1 This assembly is also mounted in the bottom compartment of the recorder. In order to gain access the following procedure must be performed.

(a) Open the paper cassette and remove the paper spool.

(b) If the power transistor is to be changed,this can now be done after removing the 2 transistor mounting screws,withdrawing and disconnecting the transistor.

(c) If further access to the component chassis is required,it is necessary to remove the control unit,the left side cover and the u.v.lamp as in para 2.4 steps (a)-(h) inclusive and the cassette assembly as follows.

(d) Slip the drive roller belt off the drive roller pulley at the right end of the cassette.

(e) Loosen the cassette left pivot rod clamp screw and while supporting the left end of the cassette,withdraw the pivot rod.

(f) Move the cassette assembly toward the left to disengage the right end pivot while guiding the double pulley of the right pivot rod.

(g) With the cassette assembly out of the way,support the component chassis from beneath while removing the 3 mounting screws whose heads are on the top surface of the galvanometer deck.

(h) The component chassis is now free to be moved around for access as required. Care must be exercised to avoid damaging the interconnecting wiring.

(j) Reassembly is by the reverse of the above procedure. Refer to para 2.4 steps (j)-(n),inclusive,and para 2.5 for installation and adjustment of the u.v.lamp.

3.13 Drive Unit

3.13.1 The drive unit is accessible after removing the bottom cover plate of the recorder. The cover is retained by 4 screws,1 in each corner.

3.14 Brake System

3.14.1 The brake system is accessible after removing the bottom cover by removing the 4 corner screws and the power supply capacitor chassis as in para 3.11.1.

3.15 Paper Level Microswitch

3.15.1 The paper level microswitch is located behind the left spool cheek on the paper spool. It is accessible after simply opening the cassette.

SECTION 8

PARTS LISTS

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	Components Lists	
PL 85730	Recorder Optics and PCB Assembly	8.2
PL 84300	12-Ch. Trace Identification Bridge Assembly	8.5
PL 85918	24-Ch. Trace Identification Bridge Assembly	8.7
PL 84150	Cassette Assembly	8.9
PL 84140	Drive Unit	8.10
PL 85880	Solenoid Assembly	8.12
PL 84289	Transformer Mounting Assembly	8.13
PL 84299	Capacitor Chassis Assembly	8.16
PL 87881	Power Supply and Lamp Regulator Board	8.18
PL 84250	Power Supply and Lamp Regulator Board	8.22
PL 85380	Component Chassis	8.28
PL 85360	Timer Board	8.31
PL 85750	Servo Board Chassis	8.33
PL 84260	Servo Board	8.34
PL 87885	Servo Board	8.41
PL 84239	Control Panel	8.44
PL 84232	Control Logic Board	8.45
PL 85925	Accessories Kit	8.50

1. ORDERING INFORMATION

1.1 To order your replacement part, address the order to your local agent or to:

Service Department, SE Labs (EMI) Ltd., North Feltham Trading Estate, Feltham, Middlesex, TW14 0TD, Tel No: 01-751-5951 or Northern Sales Office, Bessel Lane, Stapleford, Nottingham, Tel No: 0602 397255.

1.2 Specify the following information for each part:

(a) Model and serial number of the equipment

(b) PL number

(c) Circuit reference

(d) SEL item number and component number

(e) Stock description and manufacturer's reference

PARTS LIST 085730/00 ISSUE 05 C.N. 08783 DATE 26/02/79 C>RECORDER/OPTICS PCB ASSY SE6300
****

IT	COMP. NUMBER S	STOCK DESCRIPTION	QTY	UN	NOTES
T01			0		NOTE-THIS PL ASSY TO DRG E85730
001	PL/084210/00	LAMP HOUSING ASSY	1	EA	
002	PL/084220/00	E RECORDER SUB-ASSY	1	EA	RECORDER SUB-ASSY
003	PL/084289/00	TRANSFORMER MOUNTING ASSY	1	EA	
004	084292/00	D LIGHT SHIELD ASSY	1	EA	
005	PL/084293/00	LENS HOLDER ASSY	1	EA	
006	PL/084294/00	TRACE MIRROR 1 ASSY	1	EA	
007	PL/084295/00	TRACE MIRROR 2 ASSY	1	EA	
008	PL/084296/00	GRID MIRROR ASSY	1	EA	
009	PL/084297/00	LENS HOLDER ASSY	1	EA	
010	PL/085360/00	TIMER BOARD ASSY	1	EA	
011	PL/085550/00	POWER SUPPLY CHASSIS ASSY	1	EA	
012	PL/085570/00	CABLELOOM ASSY	1	EA	
013	PL/085750/00	SERVO BOARD CHASSIS ASSY	1	EA	
014	PL/085760/00	CABLEFORM ASSY	1	EA	
015	085470/00	D BACK PANEL-SCREEN PRINTED	1	EA	
018	085362/00	B BRACKET SWITCH MOUNTING	1	EA	
019	084833/00	B HEATSINK MACHINED	1	EA	MANUFACTURED FROM B84834
020	084278/00	E BASEPLATE	1	EA	
021	KS/015930/00	TERMINAL BLOCK 16 WAY NO 10470	1	EA	
022	NS/020022/00	CORD CLIP,FASTEX 172-ED-962-00	2	EA	
023	AS/002521/00	SPRING LATCH ASSY (KIT OF 2)	2	EA	
024	NS/020193/00	CLAMP SELF ADHESIVE CABLE	5	EA	
025	NS/020192/00	CLAMP SELF ADHESIVE CABLE	3	EA	
026	WS/028551/00	FOOT BLACK PT NO 162	4	EA	

PARTS LIST 085730/00 ISSUE 05 C.N. 08783 DATE 26/02/79 C>RECORDER/OPTICS PCB ASSY SE6300
****

IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
027	QS/022653/00		P.B. SWITCH TJ4A2C/O(WITH BRAC	1	EA	
028	JS/014074/00		WOTAN LAMPS (100W)	1	EA	
029	JS/014075/00		LAMP UV CS100W/2 PHILLIPS	0	EA	* ALTN TO ITEM 28
030	LS/017537/00		TY-RAP. TY-23M. T.BETTS	7	EA	
031	RS/023255/00		FUSE HOLDERS L2088 BELLING	3	EA	
032	KS/015725/00		S/A CORD CLIP 172-ED-961-00	2	EA	
033	QS/022652/00		SW P.B DPDT WITH BRKT TJ4AZC/O	1	EA	
035	RS/023283/00		FUSE LINK FAST BLO L1427A/3.15	1	EA	FS1
036	RS/023284/00		FUSE LINK 3.15A FAST BLO SCHTR	0	EA	* ALTN TO ITEM 35
037	RS/023285/00		FUSE LINK 3.15A TIME LAG SCHTR	2	EA	FS2 & 3
038	RS/023286/00		FUSE LINK 3.15A TIME LAG	0	EA	* ALTN TO ITEM 37
039	YS/040324/00		SC SLT PAN M3 10 ST.S	1	EA	
040	YS/040323/00		SC SLT PAN M3 6 ST.S	1	EA	
041	YS/040086/00		SC POZ PAN M3 X 6 MSZP	2	EA	
042	YS/040087/00		SC POZ PAN M3 X 8 MSZP	2	EA	
043	YS/040106/00		SC POZ PAN M5 X 12 MSZP	4	EA	
044	YS/040090/00		SC POZ PAN M3 X 16 MSZP	2	EA	
045	YS/040097/00		SC POZ PAN M4 X 12 MSZP	2	EA	
046	YS/040101/00		SC POZ PAN M4 X 30 MSZP	1	EA	
047	YS/040096/00		SC POZ PAN M4 X 10 MSZP	25	EA	
048	YS/040095/00		SC POZ PAN M4 X 8 MSZP	4	EA	
049	YS/040088/00		SC POZ PAN M3 X 10 MSZP	10	EA	
050	YS/040465/00		WASHER CRINKLE M3 ST.S	30	EA	
051	YS/040467/00		WASHER CRINKLE M5 ST.S	4	EA	
052	YS/040401/00		WASHER STD M3 HEAVY MSZP	15	EA	

PARTS LIST 085730/00 ISSUE 05 C.N. 08783 DATE 26/02/79 C>RECORDER/OPTICS PCB ASSY SE6300 303104000
****

IT	COMP. NUMBER	S	STOCK DESCRIPTION		QTY	UN	NOTES
053	YS/040466/00		WASHER CRINKLE M4	ST.S	37	EA	
054	YS/040385/00		NUT HEX FULL M3	MSZP	16	EA	
055	YS/040386/00		NUT HEX FULL M4	MSZP	9	EA	
056	YS/040099/00		SC POZ PAN M4 X 20	MSZP	4	EA	
057	YS/040402/00		WASHER STD M4 HEAVY	MSZP	6	EA	
058	YS/040434/00		WASHER SHK/PRF M4 INT/T	MSCP	2	EA	
059	YS/040005/00		SC POZ CSK M3 X 12	MSZP	2	EA	
060	YS/040091/00		SC POZ PAN M3 X 20	MSZP	2	EA	
061	YS/040403/00		WASHER STD M5 HEAVY	MSZP	4	EA	
062	YS/040502/00		SC POZ PAN M2,5 X 8	MSZP	4	EA	
063	YS/040548/00		NUT HEX FULL M2,5	MSZP	4	EA	
064	YS/040552/00		WASHER STD M2,5	MSZP	4	EA	
065	YS/040558/00		WASHER CRINKLE M2,5	ST.S	4	EA	

PARTS LIST 084300/00 ISSUE 03 C.N. 08850 DATE 12/03/79 C>12 CHANNEL TRACE IDENT BRIDGE ASSY SE6300
****

IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE- THIS PL ASSEMBLE TO
T02				0		DRAWING NUMBER D84300
001	PL/085745/00			1		TRACE IDENT BRIDGE SUB-ASSY
003	PL/085549/00			1		BELT
004	PL/085567/00			1		PULLEY
005	PL/085740/00			1		12 CHANNEL DISC
006	PL/085473/00		MIRROR MOUNT ASSY	1	EA	
010	085350/00		A DRIVE SHAFT	1	EA	
011	085351/00		A DRIVEN SHAFT	1	EA	
012	085878/00		A DISC SHAFT	1	EA	
014	085359/00		A ROLLER PIVOT	1	EA	
015	085356/00		B PULLEY SUPPORT	1	EA	
016	085089/00		A BEVEL GEAR	2	EA	
018	085355/00		B PULLEY,17 TOOTH	1	EA	
019	085354/00		B PULLEY,13 TOOTH	1	EA	
020	085352/00		B PULLEY,10 TOOTH	1	EA	
021	085568/00		B PULLEY,13 TOOTH,TENSION	1	EA	
022	085727/00		B PULLEY,12 TOOTH	1	EA	
023	085728/00		B PULLEY,13 TOOTH	1	EA	
025	085471/00		A MIRROR BRACKET	2	EA	
027	TS/025153/00		SPIROLEX RING RS-78-S	4	EA	
028	NS/019522/00		SPIROLUX RING RS 106	2	EA	
029	NS/020163/00		RETAINING RING EXT SPIRO. RS15	2	EA	
030	NS/019476/00		RETAINING RINGS RR62	3	EA	
031	NS/020137/00		RETAINING RING. SPIROLOX".RS75	2	EA	

PARTS LIST 084300/00 ISSUE 03 C.N. 08850 DATE 12/03/79 C>12 CHANNEL TRACE IDENT BRIDGE ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
033	XS/029064/00		DRIVE BELT SEL DRG B28219/04	1	EA	
034	XS/029130/00		DRIVE BELT SEL DRG B28219/38	1	EA	
035	IS/013291/00		BRNG NEEDLE ROLLER HK0509 NA	0	EA	* ALTN TO ITEM 36
036	IS/013230/00		NEEDLE BEARING F58	10	EA	
037	KS/015302/00		SPIROL PIN 1.5MM X 10MM	2	EA	
039	NS/020119/00		CIRCLIP EXT :E: 5MM DIN1500-4	4	EA	
040	NS/019487/00		CIRCLIP 1440/5	4	EA	
042	YS/040593/00		SC GRUB SKT M3CUP 3 MS.PK.BK	1	EA	
043	YS/040594/00		SC GRUB SKT M3CUP 5 MS.PK.BK	4	EA	
044	YS/040502/00		SC POZ PAN M2,5 X 8 MSZP	2	EA	
045	YS/040096/00		SC POZ PAN M4 X 10 MSZP	2	EA	
046	YS/040552/00		WASHER STD M2,5 MSZP	2	EA	
047	YS/040408/00		WASHER LARGE M5 HEAVY MSZP	12	EA	
048	YS/040402/00		WASHER STD M4 HEAVY MSZP	1	EA	
049	YS/040466/00		WASHER CRINKLE M4 ST.S	3	EA	
050	YS/040558/00		WASHER CRINKLE M2,5 ST.S	2	EA	
051	YS/040407/00		WASHER LARGE M4 HEAVY MSZP	2	EA	
052	YS/040386/00		NUT HEX FULL M4 MSZP	1	EA	
056	SS/024259/00		ALVANIA GREASE 2	0	EA	A/R

PARTS LIST 085918/00 ISSUE 03 C.N. 08773 DATE 09/03/79 C>24 CHANNEL TRACE IDENT BRIDGE ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE- THIS PL ASSEMBLE TO
T02				0		DRAWING NUMBER D85918
001	PL/085745/00			1		TRACE IDENT BRIDGE SUB-ASSY
003	PL/085549/00			1		BELT
004	PL/085567/00			1		PULLEY
005	PL/085742/00			1		24 CHANNEL DISC
006	PL/085473/00		MIRROR MOUNT ASSY	1	EA	
010	085350/00		A DRIVE SHAFT	1	EA	
011	085351/00		A DRIVEN SHAFT	1	EA	
012	085878/00		A DISC SHAFT	1	EA	
014	085359/00		A ROLLER PIVOT	1	EA	
015	085356/00		B PULLEY SUPPORT	1	EA	
016	085089/00		A BEVEL GEAR	2	EA	
018	085355/00		B PULLEY,17 TOOTH	1	EA	
019	085354/00		B PULLEY,13 TOOTH	1	EA	
020	085352/00		B PULLEY,10 TOOTH	1	EA	
021	085568/00		B PULLEY,13 TOOTH,TENSION	1	EA	
022	085727/00		B PULLEY,12 TOOTH	1	EA	
023	085728/00		B PULLEY,13 TOOTH	1	EA	
025	085471/00		A MIRROR BRACKET	2	EA	
027	TS/025153/00		SPIROLEX RING RS-78-S	4	EA	
028	NS/019522/00		SPIROLUX RING RS 106	2	EA	
029	NS/020163/00		RETAINING RING EXT SPIRO. RS15	2	EA	
030	NS/019476/00		RETAINING RINGS RR62	3	EA	
031	NS/020137/00		RETAINING RING. SPIROLOX".RS75	2	EA	

PARTS LIST 085918/00 ISSUE 03 C.N. 08773 DATE 09/03/79 C>24 CHANNEL TRACE IDENT BRIDGE ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
033	XS/029064/00		DRIVE BELT SEL DRG B28219/04	1	EA	
034	XS/029130/00		DRIVE BELT SEL DRG B28219/38	1	EA	
035	IS/013291/00		BRNG NEEDLE ROLLER HK0509 NA	0	EA	* ALTN TO ITEM 36
036	IS/013230/00		NEEDLE BEARING F58	10	EA	
037	KS/015302/00		SPIROL PIN 1.5MM X 10MM	2	EA	
039	NS/020119/00		CIRCLIP EXT :E: 5MM DIN1500-4	4	EA	
040	NS/019487/00		CIRCLIP 1440/5	4	EA	
042	YS/040593/00		SC GRUB SKT M3CUP 3 MS.PK.BK	1	EA	
043	YS/040594/00		SC GRUB SKT M3CUP 5 MS.PK.BK	4	EA	
044	YS/040502/00		SC POZ PAN M2,5 X 8 MSZP	2	EA	
045	YS/040096/00		SC POZ PAN M4 X 10 MSZP	2	EA	
046	YS/040552/00		WASHER STD M2,5 MSZP	2	EA	
047	YS/040408/00		WASHER LARGE M5 HEAVY MSZP	12	EA	
048	YS/040402/00		WASHER STD M4 HEAVY MSZP	1	EA	
049	YS/040466/00		WASHER CRINKLE M4 ST.S	3	EA	
050	YS/040558/00		WASHER CRINKLE M2,5 ST.S	2	EA	
051	YS/040407/00		WASHER LARGE M4 HEAVY MSZP	2	EA	
052	YS/040386/00		NUT HEX FULL M4 MSZP	1	EA	
056	SS/024259/00		ALVANIA GREASE 2	0	EA	A/R

PARTS LIST 084150/00 ISSUE 02 C.N. 08687 DATE 10/11/78 C>CASSETTE ASSEMBLY SE 6300
****

IT	COMP. NUMBER	S	STOCK DESCRIPTION		QTY	UN	NOTES
T01					0		NOTE- THIS PL ASSEMBLE TO
T02					0		DRAWING NUMBER D84150
001	084203/00	B	CAPSTAN BONDING ASSY		1	EA	
002	081152/00	D	CASSETTE MACHINED		1	EA	MANUFACTURED FROM B85566
003	084153/00	C	SIDE PLATE,RIGHT HAND		1	EA	
004	084154/00	C	SIDE PLATE,LEFT HAND		1	EA	
005	084155/00	B	TIE BAR		1	EA	
006	084238/00	B	ROLLER PULLEY		1	EA	
007	029799/00	C	DISTANCE PIECE		2	EA	
008	030106/00	C	SPRING		1	EA	
009	040204/00	D	SPINDLE BEARING		2	EA	
011	YS/040286/00		SC POZTAPCSK M4 X 10	MSZP	6	EA	
012	YS/040685/00		SC SKT GRUB M3 X 6 CUP	MSZP	1	EA	
013	IS/013223/00		BALLRACE FLANGED SSLF 1470ZZ		2	EA	
014	KS/015299/00		SPIROL PIN 1.5MM X 4MM		2	EA	
015	SS/024512/00		NUT LOCK 10CC 242 LOCTITE		0	BT	A/R
016	085556/00	B	PRESSURE PLATE SPINDLE		1	EA	
017	085559/00	B	TORSION SPRING		1	EA	
018	084316/00	C	PRESSURE PLATE		1	EA	MANUFACTURED FROM C84315
019	085558/00	C	PRESSURE PLATE LEVER		1	EA	
021	NS/019477/00		RETAINING RING RR75 WELLWORTHY		2	EA	
022	QS/022618/00		MICRO-SWITCH V4T9YR1 BURGESS		1	EA	
024	KS/015303/00		SPIROL PIN 1.5MM X 12MM		3	EA	
025	YS/040499/00		SC POZ PAN M2 X 12	MSZP	2	EA	
026	YS/040547/00		NUT HEX FULL M2	MSZP	2	EA	

PARTS LIST 084140/00 ISSUE 05 C.N. 08745 DATE 16/01/79 C>DRIVE UNIT ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE- THIS PL ASSY TO DRG D84140
001	PL/085370/00			1		
002	084279/00		C MOTOR (D.C.)	1	EA	
003	085372/00		B SIDE PLATE	1	EA	
004	084159/00		B MOTOR MOUNTING PLATE	1	EA	
005	084189/00		B TIE BAR	2	EA	
006	084191/00		B DRIVE PULLEY	1	EA	
008	084187/00		A SPACER	4	EA	
009	084188/00		A SPACER	3	EA	
011	AS/001785/00		CONN 12W.PLUG SMS 12P-1	1	EA	PL15
012	AS/002242/00		RECEPTACLE Q-MATE SMS-3R-B1 BB	1	EA	SK23
013	AS/002535/00		FORMED SKT SC24M-1-DJ8-BL BICC	3	EA	
014	AS/002536/00		FORMED PIN SM20M-1-DJ8-BL BICC	3	EA	
015	KS/015331/00		SOLDER TAG 2 BA	3	EA	
016	YS/040087/00		SC POZ PAN M3 X 8 MSZP	2	EA	
017	YS/040095/00		SC POZ PAN M4 X 8 MSZP	2	EA	
018	YS/040011/00		SC POZ CSK M4 X 8 MSZP	4	EA	
019	YS/040106/00		SC POZ PAN M5 X 12 MSZP	2	EA	
020	YS/041520/00		SCREW PAN HD. POS. 10-32UNFX7/	4	EA	
021	YS/040461/00		WASHER CRINKLE M3 BCUCP	2	EA	
022	YS/040462/00		WASHER CRINKLE M4 BCUCP	2	EA	
023	YS/040447/00		WASHER SPRING M5 SQ/SECT.MSCP	6	EA	
024	YS/040401/00		WASHER STD M3 HEAVY MSZP	2	EA	
025	YS/040387/00		NUT HEX FULL M5 MSZP	2	EA	
026	YS/040403/00		WASHER STD M5 HEAVY MSZP	4	EA	

PARTS LIST 084140/00 ISSUE 05 C.N. 08745 DATE 16/01/79 C>DRIVE UNIT ASSY SE6300
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IT	COMP. NUMBER S	STOCK DESCRIPTION	QTY	UN	NOTES
027	KS/015867/00	SPIROL PIN 2.5 DIAX 24 LONGMBT	1	EA	
028	YS/041210/00	WASHER SHK/PRF 2BA MSCP	3	EA	
029	NS/020191/00	RETAINING RING SPIROLUX RS 109	3	EA	
030	OS/020147/00	GROMMET HV3109A HELLERMAN	1	EA	
031	LS/017610/00	WIRE PVC 16/0.2 V10/RED BICC	0	M	100 MM
032	LS/016899/00	WIRE 16/0.2 TYPE 2 OR/BRN	0	M	100 MM
033	LS/017575/00	WIRE GRN./YELL 16/02 PVC TYPE	0	M	450 MM
034	LS/017121/00	PVC WIRE 7/0.2 TYPE 2 BLACK	0	M	100MM LG
036	LS/016568/00	CAB PVC TWIN SCRND 7/0.2 R/BU	0	M	350MM LG
038	OS/020079/00	SLEEVE H30X1/2 LG BLACK	2	EA	
040	LS/017537/00	TY-RAP. TY-23M. T.BETTS	6	EA	
044	WS/028145/00	SOLDER 22SWG	0	KG	A/R

PARTS LIST 085880/00 ISSUE 03 C.N. 08654 DATE 27/11/78 C>SØLENØID ASSY SE6300
****

IT	COMP. NUMBER	S	STØCK DESCRIPTIØN	QTY	UN	NØTES
T01				0		NØTE THIS PL.ASSEMBLE TØ DRG. A85880
001	HS/012221/00		SØLENØID 110V.TØ.B85882 SER. 4	1	EA	
004	AS/002241/00		PLUG Q-MATE SMS-3P-B1 B-BURNDY	1	EA	PL22
006	AS/002534/00		FØRMED PIN SM24M-1-DJ8-BL BICC	2	EA	
007	LS/017537/00		TY-RAP. TY-23M. T.BETTS	3	EA	

PARTS LIST 084289/00 ISSUE 08 C.N. 08770 DATE 01/03/79 C>TRANSFORMER MOUNTING ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE- THIS PL ASSEMBLE TO
T02				0		DRAWING NUMBER D84289
001	085364/00	D	TRANSFORMER MOUNTING BRACKET	1	EA	
002	084277/00	B	CAPACITOR CLAMP	1	EA	
003	085749/00	B	SHIELD	1	EA	
004	045303/00	C	LIGHTNING FLASH	1	EA	
005	ES/008598/00		TRANSFORMER TO SEL DRG D5/584	1	EA	T1
008	QS/022512/00		RIVET 3,2D X 6,1LG TSP/D424	1	EA	
009	KS/015863/00		SOLDER TAG.S/E.BRASS. T575-M5	4	EA	
010	KS/015407/00		TERMINAL 6BA 475 H.T.D.	1	EA	ET3
013	CS/032502/00		CAP 4700MFD +50-10% 160V C018	0	EA	* ALTN TO ITEM 74
014	CS/032503/00		CAP 4700MFD +50%-10% 160V NOVA	0	EA	* ALTN TO ITEM 74
015	DS/036196/00		R 5K6 5% POWER HSA-5 C.G.S	1	EA	R3
016	BS/005441/00		BRIDGE RECT 5SB40 INT-RECT	1	EA	D1
017	BS/005442/00		BRIDGE RECT SCBH-4 SEMTECH	0	EA	* ALTN TO ITEM 16
018	YS/040557/00		WASHER CRINKLE M2 ST.S	2	EA	
019	YS/040467/00		WASHER CRINKLE M5 ST.S	2	EA	
020	YS/040086/00		SC POZ PAN M3 X 6 MSZP	1	EA	
021	YS/040106/00		SC POZ PAN M5 X 12 MSZP	6	EA	
022	YS/040496/00		SC POZ PAN M2 X 6 MSZP	2	EA	
023	YS/040387/00		NUT HEX FULL M5 MSZP	4	EA	
024	YS/040386/00		NUT HEX FULL M4 MSZP	2	EA	
025	YS/040547/00		NUT HEX FULL M2 MSZP	2	EA	
026	YS/040405/00		WASHER STD M5 LIGHT MSZP	4	EA	
027	YS/040451/00		WASHER SPRING M5 R/SECT MSCP	4	EA	

PARTS LIST 084289/00 ISSUE 08 C.N. 08770 DATE 01/03/79 C>TRANSFØRMER MØUNTING ASSY SE6300
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IT	CØMP. NUMBER	S	STØCK DESCRIPTIØN		QTY	UN	NØTES
028	YS/040466/00		WASHER CRINKLE M4	ST.S	2	EA	
029	YS/040551/00		WASHER STD M2	MSZP	2	EA	
030	YS/040465/00		WASHER CRINKLE M3	ST.S	1	EA	
031	LS/016884/00		W WIRE 16/0.2 61-12 PT6 T2 BR		0	M	450 MM
032	LS/016889/00		W WIRE 16/0.2 PVC TYPE 2 BLUE		0	M	650 MM
033	LS/016890/00		WIRE 16/0.2 TYPE 2 VIØLT		0	M	450 MM
034	LS/016891/00		W WIRE 16/0.2 61-12 PT6 T2 SL		0	M	250 MM
035	LS/016896/00		W WIRE 16/0.2 TYPE 2 RD/BRN		0	M	200 MM
036	LS/016897/00		W WIRE 16/0.2 TYPE 2 RD/BLU		0	M	200 MM
037	LS/016916/00		WIRE 16/0.2 TYPE 2 WHT/ØRG		0	M	450 MM
038	LS/017360/00		WIRE PVC 16/0,2 BL/BK TYPE 2		0	M	250 MM
039	LS/017376/00		WIRE PVC 16/0,2 SL/Y TYPE2		0	M	250 MM
040	LS/017576/00		WIRE RED/ØRAN. 16/02 PVC TYPE		0	M	500 MM
041	LS/017579/00		WIRE BLUE/ØRAN.16/02 PVC TYPE		0	M	450 MM
042	LS/017578/00		WIRE BLUE/BRN.16/02 PVC TYPE 2		0	M	450 MM
043	LS/017002/00		WIRE 7/0.2 TYPE2 GREY/BLACK		0	M	250 MM
044	LS/017329/00		W PVC WIRE 7/0.2 TYPE 2 GRY/RD		0	M	250 MM
045	LS/017473/00		WIRE 7/0.2 GY/GN TYPE 2		0	M	300 MM
046	LS/017474/00		WIRE 7/0.2 GY/BRN TYPE 2		0	M	300 MM
047	LS/016910/00		WIRE 16/0.2 TYPE 2 GRY/ØRG		0	M	250 MM
050	LS/016951/00		PVC CØU WIRE 32X0.2MM		0	M	300 MM
051	LS/016954/00		PVC CØU WIRE 32X0.2MM		0	M	800 MM
052	LS/016956/00		W WIRE 32/0.2 PVC. BLUE		0	M	250 MM
053	LS/016957/00		W WIRE 32/0.2 PVC. VIØLET		0	M	250 MM
054	LS/016958/00		PVC CØU WIRE 32X0.2MM		0	M	300 MM

PARTS LIST 084289/00 ISSUE 08 C.N. 08770 DATE 01/03/79 C>TRANSFORMER MOUNTING ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
055	LS/016959/00		PVC COU WIRE 32X0.2MM	0	M	300 MM
056	LS/017392/00		WIRE PVC 32/0,2 GN/Y TYPE 3	0	M	400 MM
057	LS/017394/00		WIRE PVC 32/0,2 R/0 TYPE 3	0	M	350 MM
060	LS/017071/00		TY-RAP TYPE TY-51M	5	EA	
061	AS/001789/00		PLUG 36WAY SMS36R1 BICC	1	EA	PL14
062	AS/002534/00		FORMED PIN SM24M-1-DJ8-BL BICC	4	EA	
063	AS/002536/00		FORMED PIN SM20M-1-DJ8-BL BICC	10	EA	
064	AS/002287/00		PIN SIZE 16 SM16M-B1 BICC	3	EA	
065	KS/015915/00		RECEPTACLE FASTON 250.41772-1	6	EA	
066	AS/002381/00		RECEPTACLE FASTON 42599-2 AMP	2	EA	
067	AS/002358/00		CONNECTOR FASTON 160477-1 AMP	4	EA	
068	KS/015938/00		INSULATION BOOT 154509-2 A.M.P	6	EA	
069	RS/023256/00		RUBBER BOOTS(FOR L2088) L186	2	EA	
070	WS/028145/00		SOLDER 22SWG	0	KG	A/R
071	OS/020270/00		GROMMET. HV 4163A	1	EA	
072	LS/017537/00		TY-RAP. TY-23M. T.BETTS	35	EA	
073	KS/015901/00		COMP. CLIP 1/4DIA. KKU-4	1	EA	
074	CS/032728/00		CAP 4700MF <50-10% 160V EP1191	1	EA	C1

IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE- THIS PL ASSEMBLE TO
T02				0		DRAWING NUMBER C84299
001	084930/00		D CHASSIS ASSY	1	EA	
002	084269/00		B CLAMP	2	EA	
003	085879/00		B TRANSISTOR BRACKET	1	EA	
006	085881/00		A CLAMP	1	EA	
007	KS/015859/00		COMPONENT CLIP.1"DIA. V-1010.	3	EA	
008	KS/015860/00		COMPONENT CLIP.3/4"DIA. V-1008	4	EA	
010	KS/015471/00		TERMINAL STD OFF M3 W6005 HAR	3	EA	
011	BS/003925/00		TRANS.SKT.A1303-T03 < FIXINGS	1	EA	
012	BS/002661/00		MICA WASHER 495320 T03 R.C.A.	1	EA	
013	KS/015863/00		SOLDER TAG.S/E.BRASS. T575-M5	2	EA	
014	BS/005445/00		TRANSISTOR 2N6055 MOTOROLA	1	EA	
015	BS/005446/00		TRANSISTOR 2N6055 R.C.A	0	EA	* ALTN TO ITEM 14
016	CS/032667/00		CAP 47MFD +50-10% 500V ECC	2	EA	C2,C3
017	CS/032508/00		CAP 47MFD +50-10% 500V NOVEA	0	EA	* ALTN TO ITEM 16
018	CS/032513/00		CAP 4700MFD +50-10% 100V MUL	1	EA	C4
019	CS/032514/00		CAP 4700MFD +50-10% 100V SAFCO	0	EA	* ALTN TO ITEM 18
020	CS/032516/00		CAP 4700MFD +50-10% 100V NOVEA	0	EA	* ALTN TO ITEM 18
021	CS/032515/00		CAP 4700MFD +50-10% 100V GOULD	0	EA	* ALTN TO ITEM 18
022	CS/031184/00		CAP 680MF -10%<50% 071-18681	1	EA	C5
023	CS/032509/00		CAP 680MFD +50-10% 63V SPRAGUE	0	EA	* ALTN TO ITEM 22
024	CS/032511/00		CAP 4700MFD +50-10% 25V ITT	1	EA	C6
025	CS/032512/00		CAP 4700MFD +50-10% 25V SPRG	0	EA	* ALTN TO ITEM 24
026	CS/031405/00		CAP 1000MFD +50-10% 40V MULL	1	EA	C7

IT	COMP. NUMBER	S	STOCK DESCRIPTION		QTY	UN	NOTES
027	CS/032510/00		CAP 1000MFD +50-10% 40V SPRG		0	EA	* ALTN TO ITEM 26
028	CS/032506/00		CAP 1MFD 10% 630V MKC10 WIMA		1	EA	C19
029	BS/005441/00		BRIDGE RECT 5SB40 INT-RECT		1	EA	D3
030	BS/005442/00		BRIDGE RECT SCBH-4 SEMTECH		0	EA	* ALTN TO ITEM 29
032	YS/040001/00		SC POZ CSK M3 X 5	MSZP	3	EA	
033	YS/040386/00		NUT HEX FULL M4	MSZP	5	EA	
034	YS/040401/00		WASHER STD M3 HEAVY	MSZP	10	EA	
035	YS/040466/00		WASHER CRINKLE M4	ST.S	9	EA	
036	YS/040465/00		WASHER CRINKLE M3	ST.S	11	EA	
038	YS/040385/00		NUT HEX FULL M3	MSZP	4	EA	
040	QS/022425/00		POP RIVET TSP/D429-BS TUCKER		10	EA	
042	SS/024354/00		TAPE SELF ADH.9X2 781-4780		0	EA	25MM
043	QS/020663/00		FLEXIFORM GROMMET G51PC		0	M	75MM
044	WS/060287/00		SOLDER MULTI-CORE 22SWG D 622		0	RL	A/R
045	SS/024321/00		ADHESIVE TYPE IS496 LOCTITE		0	EA	A/R

PARTS LIST 087881/00 ISSUE 11 C.N. 09500 DATE 06/06/80 D>P.S./LAMP REG.PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE-THIS PL.ASSEMBLE TO DRG. D87881
T02				0		CIRCUIT DIAGRAM E84251
002	PL/091077/00			1		AUTO-INSERTED PCB ASSY
015				0		MOD.RECORD SHEET A87883 REF.ONLY
079	DS/036218/00		R 33K 5% 1W TR6 ELECTROSIL	1	EA	R1.
081	DS/036242/00		R 1K 5% 2W TR8 ELECTROSIL	1	EA	R14.
082	DS/036257/00		RES. 1K 5% 2W WELWYN MR8	0	EA	* ALTN TO ITEM 81
083	DS/036346/00		RES 47K 5% 2W MR8 WELWYN	1	EA	R21
085	DS/036260/00		R 180K 5% 2W TR8 ELECTROSIL	1	EA	R30
086	DS/036261/00		R 180K 5% 2W HB ALLEN BRADLEY	0	EA	* ALTN TO ITEM 85
087	DS/036208/00		R 0R56 5% 2.5W W21 WELWYN	1	EA	R8.
088	DS/036209/00		R 0R56 5% 2.5W 74EV-R56 ERG	0	EA	* ALTN TO ITEM 87
089	DS/036211/00		R 1K2 5% 2.5W W21 WELWYN	1	EA	R50
090	DS/036241/00		R 1K2 5% 2.5W 74EV-1K2 ERG	0	EA	* ALTN TO ITEM 89
091	DS/035510/00		R 2K7 5% 2.5W W21 WELWYN	1	EA	R6
092	DS/036212/00		R 2K7 5% 2.5W 74EV-2K7 ERG	0	EA	* ALTN TO ITEM 91
094	DS/033833/00		R 150R 5% 6W W22 WELWYN	1	EA	R2
095	DS/036210/00		R 150R 5% 6W C7 CGS	0	EA	* ALTN TO ITEM 94
096	DS/036217/00		R 27K 5% 9W W23 WELWYN	1	EA	R28
097	DS/036216/00		R 27K 5% 9W 16EV-27K ERG	0	EA	* ALTN TO ITEM 96
098	DS/036221/00		R 68K 5% 9W C10 C.G.S.	2	EA	R4,5
099	DS/036220/00		R 68K 5% 9W 16EV-68K ERG	0	EA	* ALTN TO ITEM 98-
100	DS/036213/00		R 3K9 5% 12W W24 WELWYN	1	EA	R29
101	DS/036214/00		R 3K9 5% 12W 17EV-3K9 ERG	0	EA	ALTN TO ITEM 100
102	DS/035278/00		R 33K 5% 12W W24 WELWYN	1	EA	R27

PARTS LIST 087881/00 ISSUE 11 C.N. 09500 DATE 06/06/80 D>P.S./LAMP REG.PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
103	DS/036219/00		R 33K 5% 12W 17EV-33K ERG	0	EA	* ALTN TO ITEM 102
106	FS/010819/00		POT.1K. 72P.BECKMA	2	EA	RV1
108	FS/010827/00		POT 5K 10% BECK. 72P	2	EA	RV3,4.
110	CS/032662/00		CAP 6.8PF 10% 160V HS SUFLEX	1	EA	C14
111	CS/004149/00		CAP 4700PF 5% 160V HS SUFLEX	1	EA	C22
112	CS/030019/00		CAP 470PF 5% 160V HS SUFLEX	2	EA	C8,9.
113	CS/031628/00		CAP 470PF 5% 160V KSN	0	EA	* ALTN TO ITEM 112
114	CS/032709/00		CAP 0.01MF 10% 400V 344-51103	1	EA	C13
115	CS/031581/00		CAP 0.01MF 10% 400V MKS	0	EA	* ALTN TO ITEM 114
116	CS/031592/00		CAP 0.10MFD 10% 100V 344-21104	1	EA	C16.
117	CS/031593/00		CAP 0.10MF 10% 100V MKS WAYCOM	0	EA	* ALTN TO ITEM 116
121	CS/031597/00		CAP 0.33MFD 10% 100V 344-21334	1	EA	C15.
122	CS/031598/00		CAP 0.33MFD 10% 100V MKS WAYC	0	EA	* ALTN TO ITEM 121.
123	CS/032663/00		CAP 22MFD 20% 35V TAP22-35	5	EA	C10,11,12,17,18
136	BS/003586/00		UNIJUNCTION 2N6027 MOTOROLA	1	EA	CSR2
138	BS/005466/00		THYRISTOR 52600M R.C.A	2	EA	CSR1,3
140	BS/005465/00		DIODE BRIDGE BS-8 INT-RECT	1	EA	D2.
142	BS/003130/00		SILICONE RECT BRD BS2 INT.RECT	2	EA	D4,6
144	BS/005633/00		DIODE BRIDGE 200V 2AMP 2KBB-20	1	EA	D5
149	BS/005452/00		TRANSISTOR 2N5401 FAIRCHILD	1	EA	TR5
150	BS/005453/00		TRANSISTOR 2N5401 MOTOROLA	0	EA	* ALTN TO ITEM 149
151	BS/002961/00		TRANSISTOR BFX85 MULLARD	1	EA	TR4
153	BS/003479/00		TRANSISTOR BD 410 TEXAS	1	EA	TR3
155	BS/002980/00		TRANSISTOR T1P29 T.I.	1	EA	TR2
156	BS/005744/00		WASHER HEAT TRANSFER J26-5001	1	EA	FOR USE WITH ITEM 123

PARTS LIST 087881/00 ISSUE 11 C.N. 09500 DATE 06/06/80 D>P.S./LAMP REG.PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
157	BS/005971/00		I.C. MC1723CG MOTOROLA ONLY	2	EA	IC1,2
159	BS/005029/00		I/C SN72311P OPEN MARKET	1	EA	IC6.
160	BS/003645/00		I/C LM311N NAT/SEM ONLY	0	EA	* ALTN TO ITEM 159
161	BS/005471/00		VOLTAGE REG 309H NAT-SEM	1	EA	IC3.
163	BS/005458/00		I/C LM3900N NATIONAL ONLY	1	EA	IC4.
164	BS/005596/00		I/C LM3900N RAYTHEON ONLY	0	EA	* ALTN TO ITEM 163
166	BS/002982/00		I/C SN72748P TEXAS ONLY	1	EA	IC5.
168	ES/008605/00		INDUCTOR TO DRG. A 85909 SEL	1	EA	L1
170	045427/00		C PULSE TRANSFORMER-MODIFIED	2	EA	T2,T3. -MADE FROM ES8411
172	RS/023269/00		FUSE END CLIP 15AMP MAX 102068	2	EA	FOR FS4 (ITEM 174)
174	RS/023281/00		FUSE 6.3X32F 500/440 L693/.500	1	EA	FS4
176	AS/002476/00		CONN. 37W. PLUG DE 37P-1-A-	1	EA	PL2
177	AS/002477/00		CONN 37W PLUG DC 37P M4	0	EA	* ALTN TO ITEM 176
178	AS/002454/00		CONN. 20W PLUGB 3492-2002	1	EA	PL3
179	AS/002618/00		WAFER ASS:Y LOCKING E5046-03AG	1	EA	PL24
180	QS/022674/00		SWITCH TEMP SENSING TS-120-B	1	EA	
181	BS/005597/00		HEATSINK TO220 TV1500 REDPOINT	1	EA	FOR MTG TR2 (ITEM 110)
182				2		
183	KS/015700/00		PIN -75401/002 BERG.	19	EA	
184	KS/015826/00		LINK 65771-001 BERG	2	EA	
185	KS/015007/00		TERMINAL LUG H2072Z HARWIN	18	EA	
188	NS/020145/00		DIODE CAP CRADLE TO DRG A84340	3	EA	
196	YS/040324/00		SC SLT PAN M3 10 ST.S	4	EA	
198	YS/040393/00		NUT HEX FULL M3 ST.S	1	EA	
200	YS/040421/00		WASHER STD M3 HEAVY ST.S	3	EA	

PARTS LIST 087881/00 ISSUE 11 C.N. 09500 DATE 06/06/80 D>P.S./LAMP REG.PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION		QTY	UN	NOTES
201	YS/040465/00		WASHER CRINKLE M3	ST.S	4	EA	
202	086722/00		A INSULATOR		1	EA	
204	KS/015706/00		SPACER M3X14MM R6076HEX HARWIN		2	EA	
205	KS/015937/00		SPACER HX TAP M3 X 20 R6079 HN		1	EA	
206	YS/040628/00		SC SLT PAN M2.5 X 10	ST.STL	1	EA	
207	YS/040559/00		NUT HEX FULL M2,5	ST.S	1	EA	
208	YS/040567/00		WASHER M2,5	ST.S	1	EA	
209	YS/040558/00		WASHER CRINKLE M2,5	ST.S	1	EA	

PARTS LIST 084250/00 ISSUE 05 C.N. 08830 DATE 09/02/79 C>P S/LAMP REG PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE-THIS PL.ASSEMBLE TO DRG. D84250
T02				0		CIRCUIT DIAGRAM E84251
001	084254/00		D PCB.DRILLED	1	EA	FROM D84254/01/02/03/05
015				0		MOD.RECORD SHEET A84253 REF.ONLY
018	DS/033996/00		R 10R 5% 1/4W CR25 MULLARD	3	EA	R11,38,39.
019	DS/007506/00		RES 10R0 5% 1/4W TR4	0	EA	* ALTN TO ITEM 18
020	DS/033939/00		R 33R 5% 1/4W CR25 MULLARD	3	EA	R15,16,20.
021	DS/034655/00		R 330R0 5% 1/4W TR4 ELECTROCIL	0	EA	* ALTN TO ITEM 20
022	DS/033942/00		R 330R 5% 1/4W CR25 MULLARD	1	EA	R48.
023	DS/007341/00		R 330R 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 22
024	DS/033943/00		R 470R 5% 1/4W CR25 MULLARD	1	EA	R54.
025	DS/006596/00		RES.470R 5% 1/4W TR4	0	EA	* ALTN TO ITEM 24
026	DS/033945/00		R 1K 5% 1/4W CR25 MULLARD	1	EA	R45.
027	DS/006924/00		R 1K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 26
028	DS/033946/00		R 1K2 5% 1/4W CR25 MULLARD	1	EA	R49
029	DS/007209/00		R 1K2 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 28
030	DS/033947/00		R 2K2 5% 1/4W CR25 MULLARD	2	EA	R36,56.
031	DS/006506/00		R 2K2 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 30
032	DS/033948/00		R 2K7 5% 1/4W CR25 MULLARD	1	EA	R55
033	DS/006841/00		RES 2K7 5% 1/4W. TR4	0	EA	* ALTN TO ITEM 32
034	DS/034029/00		R 5K6 5% 1/4W CR25 MULLARD	1	EA	R44
035	DS/007386/00		RES.5K6 5% 1/4W TR4	0	EA	* ALTN TO ITEM 34
036	DS/033951/00		R 10K 5% 1/4W CR25 MULLARD	3	EA	R31,32,57.
037	DS/006714/00		RES 10K 5% 1/4W TR4	0	EA	* ALTN TO ITEM 36
038	DS/033953/00		R 15K 5% 1/4W CR25 MULLARD	3	EA	R17,34,37.

IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
039	DS/007262/00		R 15K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 38
040	DS/033954/00		R 22K 5% 1/4W CR25 MULLARD	1	EA	R18.
041	DS/006925/00		R 22K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 40
042	DS/033994/00		R 68K 5% 1/4W CR25 MULLARD	1	EA	R53.
043	DS/006523/00		R 68K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 42
044	DS/033836/00		R 100K 5% 1/4W CR25 MULLARD	2	EA	R51,52.
045	DS/007259/00		R 100K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 44
046	DS/034049/00		R 270K 5% 1/4W CR25 MULLARD	1	EA	R43.
047	DS/032259/00			0		* ALTN TO ITEM 46
048	DS/033961/00		R 820K 5% 1/4W CR25 MULLARD	1	EA	R33.
050	DS/033962/00		R 1M 5% 1/4W CR25 MULLARD	3	EA	R19,41,42.
052	DS/033964/00		R 1M8 10% 1/4W CR25 MULLARD	1	EA	R26
054	DS/033837/00		R 100R 5% 1/4W CR25 MULLARD	1	EA	R7
055	DS/007207/00			0		* ALTN TO ITEM 54
056	DS/034294/00		R 10M 10% 1/4W CR25 MULLARD	2	EA	R46,47.
070	DS/033533/00		RES 750 OHMS 1% 0.4W MR25	2	EA	R9,12.
071	DS/034892/00		RES 2K 1% 0.4W 100PPM MR25	1	EA	R25.
072	DS/034428/00		R 2K74 1% 0.4W 50PPM MR25/VTM	2	EA	R10,13.
073	DS/034895/00		R 3K65 1% 0.4W 50PPM MR25/VTM	1	EA	R24.
074	DS/034218/00		R 7K5 1% 0.4W 50PPM MR25/VTM	1	EA	R23.
076	DS/034893/00		RES 2K43 1% 0.4W 100PPM MR25	2	EA	R22,35.
078	DS/034928/00		R 619K 1% 1/2W 100PPM MR30 MUL	1	EA	R40.
079	DS/036218/00		R 33K 5% 1W TR6 ELECTROSIL	1	EA	R1.
081	DS/036242/00		R 1K 5% 2W TR8 ELECTROSIL	1	EA	R14.
082	DS/036257/00		RES. 1K 5% 2W WELWYN MR8	0	EA	* ALTN TO ITEM 81

IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
083	DS/036215/00		R 20K 5% 2W TR8 ELECTROSIL	1	EA	R21.
084	DS/036258/00		RES. 20K 5% 2W WELWYN MR8	0	EA	* ALTN TO ITEM 83
085	DS/036260/00		R 180K 5% 2W TR8 ELECTROSIL	1	EA	R30
086	DS/036261/00		R 180K 5% 2W HB ALLEN BRADLEY	0	EA	* ALTN TO ITEM 85
087	DS/036208/00		R 0R56 5% 2.5W W21 WELWYN	1	EA	R8.
088	DS/036209/00		R 0R56 5% 2.5W 74EV-R56 ERG	0	EA	* ALTN TO ITEM 87
089	DS/036211/00		R 1K2 5% 2.5W W21 WELWYN	1	EA	R50
090	DS/036241/00		R 1K2 5% 2.5W 74EV-1K2 ERG	0	EA	* ALTN TO ITEM 89
091	DS/035510/00		R 2K7 5% 2.5W W21 WELWYN	1	EA	R6
092	DS/036212/00		R 2K7 5% 2.5W 74EV-2K7 ERG	0	EA	* ALTN TO ITEM 91
094	DS/033833/00		R 150R 5% 6W W22 WELWYN	1	EA	R2
095	DS/036210/00		R 150R 5% 6W C7 CGS	0	EA	* ALTN TO ITEM 94
096	DS/036217/00		R 27K 5% 9W W23 WELWYN	1	EA	R28
097	DS/036216/00		R 27K 5% 9W 16EV-27K ERG	0	EA	* ALTN TO ITEM 96
098	DS/036221/00		R 68K 5% 9W C10 C.G.S.	2	EA	R4,5
099	DS/036220/00		R 68K 5% 9W 16EV-68K ERG	0	EA	* ALTN TO ITEM 98
100	DS/036213/00		R 3K9 5% 12W W24 WELWYN	1	EA	R29
101	DS/036214/00		R 3K9 5% 12W 17EV-3K9 ERG	0	EA	* ALTN TO ITEM 100
102	DS/035278/00		R 33K 5% 12W W24 WELWYN	1	EA	R27
103	DS/036219/00		R 33K 5% 12W 17EV-33K ERG	0	EA	* ALTN TO ITEM 102
104	DS/032384/00		R 22R 2% 1/2W TR5 ELECTROSIL	1	EA	R58
106	FS/010819/00		POT.1K. 72P.BECKMA	2	EA	RV1,2.
108	FS/010827/00		POT 5K 10% BECK. 72P	2	EA	RV3,4.
110	CS/032662/00		CAP 6.8PF 10% 160V HS SUFLEX	1	EA	C14
111	CS/004149/00		CAP 4700PF 5% 160V HS SUFLEX	1	EA	C22

PARTS LIST 084250/00 ISSUE 05 C.N. 08830 DATE 09/02/79 C>P S/LAMP REG PCB ASSY SE6300
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IT	COMP. NUMBER S	STOCK DESCRIPTION	QTY	UN	NOTES
112	CS/030019/00	CAP 470PF 5% 160V HS SUFLEX	2	EA	C8,9.
113	CS/031628/00	CAP 470PF 5% 160V KSN	0	EA	* ALTN TO ITEM 112
114	CS/032709/00	CAP 0.01MF 10% 400V 344-51103	1	EA	C13
115	CS/031581/00	CAP 0.01MF 10% 400V MKS	0	EA	* ALTN TO ITEM 114
116	CS/031592/00	CAP 0.10MFD 10% 100V 344-21104	1	EA	C16.
117	CS/031593/00	CAP 0.10MF 10% 100V MKS WAYCOM	0	EA	* ALTN TO ITEM 116
121	CS/031597/00	CAP 0.33MFD 10% 100V 344-21334	1	EA	C15.
122	CS/031598/00	CAP 0.33MFD 10% 100V MKS WAYC	0	EA	* ALTN TO ITEM 121.
123	CS/032663/00	CAP 22MFD 20% 35V TAP22-35	5	EA	C10,11,12,17,18
126	BS/003177/00	DIODE 10M/A 75V 1N4148 MULLARD	9	EA	D9,10,D13-19.
127	BS/002045/00	DIODE 10M/A 100V 1N914 TRANSIT	0	EA	* ALTN TO ITEM 126.
129	BS/002696/00	Z.DIODE 10V 5% 400M/W BZY88C10	1	EA	D12.
131	BS/002699/00	Z.DIODE 15V 5% 400M/W BZY88C15	1	EA	D11.
133	BS/005467/00	Z.DIODE 30V 5W 1N5363B MOTOROL	1	EA	D7.
134	BS/005468/00	Z.DIODE 30V 5W 5ZS30B INT-RECT	0	EA	* ALTN TO ITEM 133.
136	BS/003586/00	UNIJUNCTION 2N6027 MOTOROLA	1	EA	CSR2
138	BS/005466/00	THYRISTOR 52600M R.C.A	2	EA	CSR1,3
140	BS/005465/00	DIODE BRIDGE BS-8 INT-RECT	1	EA	D2.
142	BS/003130/00	SILICONE RECT BRD BS2 INT.RECT	2	EA	D4,6
144	BS/005633/00	DIODE BRIDGE 200V 2AMP 2KBB-20	1	EA	D5
149	BS/005452/00	TRANSISTOR 2N5401 FAIRCHILD	1	EA	TR5
150	BS/005453/00	TRANSISTOR 2N5401 MOTOROLA	0	EA	* ALTN TO ITEM 149
151	BS/002961/00	TRANSISTOR BFX85 MULLARD	1	EA	TR4
153	BS/003169/00	TRANSISTOR 2N6177 R.C.A	1	EA	TR3
155	BS/002980/00	TRANSISTOR T1P29 T.I.	1	EA	TR2

PARTS LIST 084250/00 ISSUE 05 C.N. 08830 DATE 09/02/79 C>P S/LAMP REG PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
157	BS/002983/00		I/C SN72723L TEXAS ONLY	2	EA	IC1,2.
159	BS/005029/00		I/C SN72311P OPEN MARKET	1	EA	IC6.
160	BS/003645/00		I/C LM311N NAT/SEM ONLY	0	EA	* ALTN TO ITEM 159
161	BS/005471/00		VOLTAGE REG 309H NAT-SEM	1	EA	IC3.
163	BS/005458/00		I/C LM3900N NATIONAL ONLY	1	EA	IC4.
164	BS/005596/00		I/C LM3900N RAYTHEON ONLY	0	EA	* ALTN TO ITEM 163
166	BS/002982/00		I/C SN72748P TEXAS ONLY	1	EA	IC5.
168	ES/008605/00		INDUCTOR TO DRG. A 85909 SEL	1	EA	L1
170	045427/00		C PULSE TRANSFORMER-MODIFIED	2	EA	T2,T3. -MADE FROM ES8411
172	RS/023269/00		FUSE END CLIP 15AMP MAX 102068	2	EA	FOR FS4 (ITEM 174)
174	RS/023281/00		FUSE 6.3X32F 500/440 L693/.500	1	EA	FS4
176	AS/002476/00		CONN. 37W. PLUG DE 37P-1-A-	1	EA	PL2
177	AS/002477/00		CONN 37W PLUG DC 37P M4	0	EA	* ALTN TO ITEM 176
178	AS/002454/00		CONN. 20W PLUGB 3492-2002	1	EA	PL3
179	AS/002241/00		PLUG Q-MATE SMS-3P-B1 B-BURNDY	1	EA	PL24
181	BS/005597/00		HEATSINK TO220 TV1500 REDPOINT	1	EA	FOR MTG TR2 (ITEM 110)
182	AS/002534/00		FORMED PIN SM24M-1-DJ8-BL BICC	2	EA	
183	KS/015494/00		PIN -75404/002 BERG	19	EA	
184	KS/015826/00		LINK 65771-001 BERG	2	EA	
185	KS/015007/00		TERMINAL LUG H2072Z HARWIN	18	EA	
186	KS/015240/00		W PIN TYPE H2088	2	EA	
188	NS/020145/00		DIODE CAP CRADLE TO DRG A84340	3	EA	
196	YS/040324/00		SC SLT PAN M3 10 ST.S	4	EA	
198	YS/040393/00		NUT HEX FULL M3 ST.S	1	EA	
200	YS/040421/00		WASHER STD M3 HEAVY ST.S	3	EA	

PARTS LIST 084250/00 ISSUE 05 C.N. 08830 DATE 09/02/79 C>P S/LAMP REG PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
201	YS/040465/00		WASHER CRINKLE M3 ST.S	4	EA	
202	086722/00		A INSULATOR	1	EA	
204	KS/015706/00		SPACER M3X14MM R6076HEX HARWIN	2	EA	
205	KS/015937/00		SPACER HX TAP M3 X 20 R6079 HN	1	EA	
206	YS/040628/00		SC SLT PAN M2.5 X 10 ST.STL	1	EA	
207	YS/040559/00		NUT HEX FULL M2,5 ST.S	1	EA	
208	YS/040567/00		WASHER M2,5 ST.S	1	EA	
209	YS/040558/00		WASHER CRINKLE M2,5 ST.S	1	EA	
210	LS/017121/00		PVC WIRE 7/0.2 TYPE 2 BLACK	0	M	150MM LG
211	LS/017330/00		W PVC WIRE 7/0.2 TYPE 2 WH/BRN	0	M	150MM LG

PARTS LIST 085380/00 ISSUE 04 C.N. 08496 DATE 30/05/79 C>COMPONENT CHASSIS ASSEMBLY SE 6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE-THIS PL.ASSEMBLE TO DRG. C85380
001	085382/00		C CHASSIS-DETAIL ASSY.	1	EA	
002	086721/00		B LIGHT SHIELD	1	EA	
003	ES/008423/00		IGNITION TRANSFORMER 5/394	1	EA	T4
004	ES/008599/00		CHOKE TO SEL SPEC.C5-585	1	EA	L2
006	BS/005448/00		TRANSISTOR PMD-25K-120 LAMBDA	1	EA	TR6
007	BS/002909/00		DIODE 5A 100V 1N3880/R MOTROLA	1	EA	D20
008	BS/005474/00		DIODE IN3880R MULLARD	0	EA	* ALTN TO ITEM 7
009	DS/036222/00		R OR1 5% 25W HSA25-OR1-5 C.G.S	1	EA	R57
010	DS/036223/00		R OR1 5% 25W WH25-OR1-5 WELWYN	0	EA	* ALTN TO ITEM 9
012	CS/032659/00		CAP 220MFD +50-10% 100V ECC	2	EA	C20 & 21
013	CS/032660/00		CAP 220MFD +50-10% 100V SAFCO	0	EA	* ALTN TO ITEM 12
014	DS/034743/00		RES.OR47 5% 2.5W. W21	1	EA	R56
015	DS/036238/00		R OR47 5% 2.5W C3A-R47-5 C.G.S	0	EA	* ALTN TO ITEM 14
016	GS/011231/00		TOROID CORE MM627/K4(MULLARD)	1	EA	
018	BS/003925/00		TRANS.SKT.A1303-T03 < FIXINGS	1	EA	USE WITH ITEM 6
019	BS/002661/00		MICA WASHER 495320 T03 R.C.A.	1	EA	USE WITH ITEM 6
020	BS/005475/00		MTG KIT (DO-4DIODE) KB14A RCA	1	EA	USE WITH ITEM 7 OR 8
021	KS/015899/00		INSULATED TERMINAL TAG 5100-M3	2	EA	
022	KS/015407/00		TERMINAL 6BA 475 H.T.D.	1	EA	ET6
023	KS/015471/00		TERMINAL STD OFF M3 W6005 HAR	4	EA	
024	KS/015868/00		SPACER RD CLR M3 X 4 R6061 HN	4	EA	
025	KS/015246/00		RING TERMINAL	2	EA	
026	YS/040721/00		SC POZ PAN M3 X 45 MSZP	4	EA	
027	YS/040085/00		SC POZ PAN M3 X 5 MSZP	4	EA	

PARTS LIST 085380/00 ISSUE 04 C.N. 08496 DATE 30/05/79 C>COMPONENT CHASSIS ASSEMBLY SE 6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
028	YS/040003/00		SC POZ CSK M3 X 8 MSZP	5	EA	
029	YS/040001/00		SC POZ CSK M3 X 5 MSZP	3	EA	
030	YS/040339/00		SC SLT CH M3 5 NYLON	1	EA	
031	YS/040087/00		SC POZ PAN M3 X 8 MSZP	2	EA	
032	YS/040385/00		NUT HEX FULL M3 MSZP	5	EA	
034	YS/040403/00		WASHER STD M5 HEAVY MSZP	1	EA	
035	YS/040401/00		WASHER STD M3 HEAVY MSZP	3	EA	
037	YS/040465/00		WASHER CRINKLE M3 ST.S	15	EA	
040	NS/019545/00		W CABLE CLIP NX1	1	EA	
043	LS/017537/00		TY-RAP. TY-23M. T.BETTS	15	EA	
044	LS/017071/00		TY-RAP TYPE TY-51M	1	EA	
046	LS/016883/00		WIRE 16/0.2 TYPE 2 PVC BLACK	0	M	1100 MM.
047	LS/016885/00		WIRE 16/0.2 61-12-PT6-T2 RED	0	M	800MM
048	LS/016895/00		WIRE 16/0.2 TYPE 2 RD/BLK	0	M	470 MM.
049	LS/016915/00		W WIRE 16/0.2 61-12 PT6 T2 W/R	0	M	200 MM.
050	LS/017575/00		WIRE GRN./YELL 16/02 PVC TYPE	0	M	250 MM.
051	LS/017330/00		W PVC WIRE 7/0.2 TYPE 2 WH/BRN	0	M	250 MM.
052	LS/016913/00		W WIRE 16/0.2 61-12 PT6 T2W/BK	0	M	280 MM.
053	LS/017340/00		W PVC WIRE 7/0.2 TYPE 2 GRN/BN	0	M	250 MM.
054	LS/017121/00		PVC WIRE 7/0.2 TYPE 2 BLACK	0	M	250 MM.
056	LS/017634/00		PTFE WIRE 19/0.25 AG/CU RED	0	M	400MM.
057	LS/017633/00		PTFE WIRE 19/0.25 AG/CU BLACK	0	M	250MM.
059	WS/028145/00		SOLDER 22SWG	0	KG	A/R
062	AS/001785/00		CONN 12W.PLUG SMS 12P-1	1	EA	PL16
063	AS/002242/00		RECEPTACLE Q-MATE SMS-3R-B1 BB	1	EA	SK24

IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
064	AS/002535/00		FORMED SKT SC24M-1-DJ8-BL BICC	2	EA	
065	AS/002534/00		FORMED PIN SM24M-1-DJ8-BL BICC	1	EA	
066	AS/002536/00		FORMED PIN SM20M-1-DJ8-BL BICC	7	EA	
067	LS/016950/00		W WIRE 32/0.2 PVC. BLACK	0	M	300MM LG
068	LS/017637/00		PVC WIRE 32/0.2 W/BN	0	M	100MM LG
069	LS/017636/00		PVC WIRE 32/0.2 W/BK	0	M	250MM LG

PARTS LIST 085360/00 ISSUE 02 C.N. 08676 DATE 10/11/78 C>TIMER PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE-THIS PL ASSY TO DRG C85360
T02				0		CIRCUIT DIAGRAM E84251
001	085755/00		C PCB.DRILLED	1	EA	FROM C85755/01/03/05
007	085472/00		B COVER SUB-ASSY	1	EA	
008	KS/015292/00		TERMINAL LUG H2032	2	EA	
009	084245/00		A END CAP	2	EA	
010	084244/00		A BRACKET-FLASH LENS MTG.	2	EA	
011	085739/00		A LENS	1	EA	
013	LS/017537/00		TY-RAP. TY-23M. T.BETTS	6	EA	
014	OS/020500/00		SLEEVING PTFE TYPE TWT 19	0	M	30MM
015	OS/020233/00		SLEEVE BK H20 X 3/8 HELLERMAN	5	EA	
016	CS/032652/00		CAP 0.068MFD 10% 400V MKC10	1	EA	C1
018	CS/032653/00		CAP 0.15MFD 10% 400V MKC10 WMA	1	EA	C2
020	CS/031767/00		CAP 0.33MFD 10% 440V MFD	1	EA	C3
022	BS/003100/00		DIODE 1A 800V IN4006 TEXAS	2	EA	D1,2.
025	BS/002662/00		S.C.R. 7A 400V 40655 R.C.A.	1	EA	CSR1.
027	ES/008590/00		TRANSFORMER TRIGGER ZS 1052/12	1	EA	T1
029	JS/014192/00		FLASHTUBE 6W 400V SG 303 AEG	1	EA	LP1
030	YS/041427/00		SCREW POZ PAN S/TAP NO2X1/4:B:	7	EA	
031	AS/002443/00		PLUG 6W. MULTICON 71-10-0616-0	1	EA	PL19
032	BS/002263/00		MOUNTING PAD TO5-001 JERMYN	1	EA	FOR MTG CSR1 (ITEM 25)
033	YS/040558/00		WASHER CRINKLE M2,5 ST.S	3	EA	
034	KS/015494/00		PIN -75404/002 BERG	5	EA	
035	OS/021194/00		BUSH CABLE ENTRY 'HELVIN' 4360	1	EA	
036	LS/017574/00		WIRE WHT./YELL. 7/02 PVC TYPE	0	M	360MM.

PARTS LIST 085360/00 ISSUE 02 C.N. 08676 DATE 10/11/78 C>TIMER PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
037	LS/016883/00		WIRE 16/0.2 TYPE 2 PVC BLACK	0	M	360MM.
038	LS/017095/00		PVC WIRE 7/0.2MM T2 BLACK/YEL.	0	M	360MM.
039	LS/017315/00		WIRE PVC INS.7-0.2 BLK/ORA.	0	M	350MM.
040	LS/017122/00		PVC WIRE 7/0.2 TYPE 2 ORANGE	0	M	380MM.

PARTS LIST 085750/00 ISSUE 03 C.N. 08763 DATE 19/12/78 C>SERVO BOARD CHASSIS ASSY SE6300
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IT	COMP. NUMBER S	STOCK DESCRIPTION	QTY	UN	NOTES
T01			0		NOTE- THIS PL ASSEMBLE TO
T02			0		DRAWING NUMBER C85750
T03			0		CIRCUIT DIAGRAM E84261
001	PL/084260/00		1		SERVO PCB
002	084308/00	B HEATSINK ASSY	1	EA	
005	BS/005447/00	TRANSISTOR PMD-25K-150 LAMBDA	1	EA	TR15
007	BS/005629/00	DIODE 1N3892R MOTOROLA	1	EA	D16
008	BS/005630/00	DIODE 1N3892R MULLARD	0	EA	* ALTN TO ITEM 7
009	DS/036198/00	R 0R5 5% POWER HSA-25 C.G.S	1	EA	R92
010	DS/036254/00	RES.0R5 5% 25W WEL. WH25-0R5-5	0	EA	* ALTN TO ITEM 9
012	BS/003925/00	TRANS.SKT.A1303-T03 < FIXINGS	1	EA	
013	BS/002661/00	MICA WASHER 495320 T03 R.C.A.	1	EA	
014	BS/005475/00	MTG KIT (DO-4DIODE) KB14A RCA	1	EA	
016	YS/040003/00	SC POZ CSK M3 X 8 MSZP	2	EA	
017	YS/040095/00	SC POZ PAN M4 X 8 MSZP	2	E/	
019	YS/040385/00	NUT HEX FULL M3 MSZP	2	EA	
021	YS/040401/00	WASHER STD M3 HEAVY MSZP	2	EA	
022	YS/040465/00	WASHER CRINKLE M3 ST.S	2	EA	
023	YS/040466/00	WASHER CRINKLE M4 ST.S	2	EA	
025	LS/017537/00	TY-RAP. TY-23M. T.BETTS	7	EA	
026	SS/024248/00	HEATSINK COMPOUND DP2623	0	EA	A/R
027	WS/028145/00	SOLDER 22SWG	0	KG	A/R
031	LS/016890/00	WIRE 16/0.2 TYPE 2 VIOLT	0	M	200 MM
032	LS/016891/00	W WIRE 16/0.2 61-12 PT6 T2 SL	0	M	200 MM
033	LS/016899/00	WIRE 16/0.2 TYPE 2 OR/BRN	0	M	350 MM

PARTS LIST 084260/00 ISSUE 05 C.N. 08889 DATE 12/03/79 C>SERVO PCB ASSY SE 6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE- THIS PL ASSY TO DRG NO.D84260
T02				0		CIRCUIT DIAGRAM E84261
001	084264/00		D SERVO PCB DRILLING	1	EA	USING D84264/01,/02,/03 & /05
015				0		MOD.RECORD SHEET,A84263,REF.ONLY
016	DS/033996/00		R 10R 5% 1/4W CR25 MULLARD	6	EA	R2,4,49,50,63,64.
017	DS/007506/00		RES 10RO 5% 1/4W TR4	0	EA	* ALTN TO ITEM 16
018	DS/033837/00		R 100R 5% 1/4W CR25 MULLARD	2	EA	R54,86
019	DS/007207/00			0		* ALTN TO ITEM 18
020	DS/033943/00		R 470R 5% 1/4W CR25 MULLARD	1	EA	R37
021	DS/006596/00		RES.470R 5% 1/4W TR4	0	EA	* ALTN TO ITEM 20
022	DS/033944/00		R 560R 5% 1/4W CR25 MULLARD	1	EA	R88
023	DS/006845/00		R 560R 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 22
024	DS/033945/00		R 1K 5% 1/4W CR25 MULLARD	5	EA	R45,73,74,95,104
025	DS/006924/00		R 1K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 24
026	DS/033946/00		R 1K2 5% 1/4W CR25 MULLARD	1	EA	R76
027	DS/007209/00		R 1K2 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 26
028	DS/034022/00		R 1K5 5% 1/4W CR25 MULLARD	1	EA	R3
029	DS/007270/00		R 1K5 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 28
030	DS/034023/00		R 1K8 5% 1/4W CR25 MULLARD	1	EA	R7
031	DS/006924/00		R 1K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 30
032	DS/033993/00		R 3K3 5% 1/4W CR25 MULLARD	2	EA	R8,96
033	DS/006930/00		RES 3K3 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 32
034	DS/033949/00		R 4K7 5% 1/4W CR25 MULLARD	3	EA	R52,68,102
035	DS/006927/00		R 4K7 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 34
036	DS/034029/00		R 5K6 5% 1/4W CR25 MULLARD	2	EA	R56,81

PARTS LIST 084260/00 ISSUE 05 C.N. 08889 DATE 12/03/79 C>SERVO PCB ASSY SE 6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
037	DS/007386/00		RES.5K6 5% 1/4W TR4	0	EA	* ALTN TO ITEM 36
038	DS/033950/00		R 6K8 5% 1/4W CR25 MULLARD	2	EA	R48,58
039	DS/006843/00		R 6K8 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 38
040	DS/034031/00		R 8K2 5% 1/4W CR25 MULLARD	3	EA	R26,39,44
041	DS/007342/00		R 8K2 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 40
042	DS/033951/00		R 10K 5% 1/4W CR25 MULLARD	4	EA	R1,61,62,75
043	DS/006714/00		RES 10K 5% 1/4W TR4	0	EA	* ALTN TO ITEM 42
044	DS/033952/00		R 12K 5% 1/4W CR25 MULLARD	1	EA	R59
045	DS/007513/00		R 12K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 44
046	DS/033953/00		R 15K 5% 1/4W CR25 MULLARD	2	EA	R57,82
047	DS/007262/00		R 15K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 46
048	DS/034037/00		R 27K 5% 1/4W CR25 MULLARD	3	EA	R25,38,43
049	DS/034171/00		RES 27K 5% 1/4W TR4	0	EA	* ALTN TO ITEM 48
050	DS/034039/00		R 39K 5% 1/4W CR25 MULLARD	1	EA	R78
051	DS/007819/00		R 39K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 50
052	DS/034040/00		R 47K 5% 1/4W CR25 MULLARD	3	EA	R14,94,103
053	DS/006846/00		R 47K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 52
054	DS/034041/00		R 56K 5% 1/4W CR25 MULLARD	2	EA	R66,100
055	DS/007295/00		R 56K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 54
056	DS/033994/00		R 68K 5% 1/4W CR25 MULLARD	2	EA	R77,91
057	DS/006523/00		R 68K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 56
058	DS/033836/00		R 100K 5% 1/4W CR25 MULLARD	5	EA	R20,23,80,84,85
059	DS/007259/00		R 100K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 58
060	DS/033957/00		R 120K 5% 1/4W CR25 MULLARD	1	EA	R65
061	DS/007975/00		R 120K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 60

IT	COMP. NUMBER	STOCK DESCRIPTION	QTY	UN	NOTES
062	DS/034048/00	R 220K 5% 1/4W CR25 MULLARD	7	EA	R11,15,18,19,24,27,40
063	DS/032098/00	R 220K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 62
064	DS/033959/00	R 330K 5% 1/4W CR25 MULLARD	2	EA	R69,79
066	DS/034051/00	R 390K 5% 1/4W CR25 MULLARD	1	EA	R83
068	DS/033960/00	R 470K 5% 1/4W CR25 MULLARD	4	EA	R21,35,41,60
070	DS/033962/00	R 1M 5% 1/4W CR25 MULLARD	3	EA	R22,36,42
072	DS/033965/00	R 2M2 10% 1/4W CR25 MULLARD	1	EA	R53
073	DS/036256/00	RES.2.2M 5% 1/4W CB	0	EA	* ALTN TO ITEM 72
074	DS/034294/00	R 10M 10% 1/4W CR25 MULLARD	1	EA	R55
075	DS/036255/00	RES.10M 5% 1/4W CB	0	EA	* ALTN TO ITEM 74
076	DS/033537/00	R 1K50 1% 0.4W 50PPM MR25/VTM	1	EA	R13
077	DS/034892/00	RES 2K 1% 0.4W 100PPM MR25	1	EA	R6
078	DS/034893/00	RES 2K43 1% 0.4W 100PPM MR25	1	EA	R12
079	DS/034897/00	R 4K75 1% 0.4W 50PPM MR25/VTM	1	EA	R72
080	DS/033539/00	R 5K11 1% 0.4W 50PPM MR25/VTM	1	EA	R5
081	DS/034093/00	R 5K62 1% 0.4W 50PPM MR25/VTM	1	EA	R70
082	DS/034095/00	R 10K 1% 0.4W 50PPM MR25/VTM	1	EA	R98
083	DS/034899/00	RES 20K .4W MR25 VTM/471	3	EA	R47,71,97
084	DS/034098/00	R 47K5 1% 0.4W 50PPM MR25/VTM	1	EA	R67
085	DS/033926/00	R 100K 1% 0.4W 50PPM MR25/VTM	3	EA	R9,10,90
086	DS/034910/00	RES 110K 1% 0.4W 100PPM MR25	1	EA	R46
087	DS/034913/00	R 150K 1% 0.4W 50PPM MR25/VTM	1	EA	R89
088	DS/034928/00	R 619K 1% 1/2W 100PPM MR30 MUL	1	EA	R51
089	DS/034004/00	R 47R 5% 1/4W CR25 MULLARD	1	EA	R101
090	DS/034166/00	RES. 47R 5% 1/4W TR4	0	EA	* ALTN TO ITEM 89

PARTS LIST 084260/00 ISSUE 05 C.N. 08889 DATE 12/03/79 C>SERVO PCB ASSY SE 6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
091	DS/036200/00		R 50R 0.1% 50PPM EE-0.125-0.1	1	EA	R17
092	DS/036201/00		R 100R 0.1% 50PPM EE-0.125-0.1	2	EA	R33,34
093	DS/036202/00		R 200R 0.1% 50PPM EE-0.125-0.1	1	EA	R32
094	DS/036203/00		R 600R 0.1% 50PPM EE-0.125-0.1	1	EA	R31
095	DS/036204/00		R 1K 0.1% 50PPM EE-0.125-0.1	1	EA	R30
096	DS/036205/00		R 2K 0.1% 50PPM EE-0.125-0.1	1	EA	R29
097	DS/036206/00		R 4K95 0.1% 50PPM EE-0.25-0.1	1	EA	R16
098	DS/036207/00		R 6K 0.1% 50PPM EE-0.125-0.1	1	EA	R28
099	DS/034429/00		R 15K 1% 0.4W 50PPM MR25/VTM	1	EA	R93
101	DS/036244/00		R 100R 5% 6W W22 WELWYN	1	EA	R99
103	DS/034304/00		R 4K7 5% 2.5W W21 WELWYN	1	EA	R87
106	FS/010829/00		POT 5000HM 10% 0.5W 85W	1	EA	RV1
107	FS/010802/00		POT 500R 10% 0.5W 3299W-1-501	0	EA	* ALTN TO ITEM 106
108	FS/010828/00		POT 10K 10% 0.5W 85W	1	EA	RV2
109	FS/010830/00		POT 10K 10% 0.5W 3299W-1-103	0	EA	* ALTN TO ITEM 108
119	CS/031600/00		CAP 0.68MF 10% 100V 344-21684	2	EA	C26,27
120	CS/031601/00		CAP 0.68MF 10% 100V MKS WAYCOM	0	EA	* ALTN TO ITEM 119
121	CS/031620/00		CAP 33PF 5% 160V HS33/5-10/160	1	EA	C8
122	CS/031621/00			0		* ALTN TO ITEM 121
123	CS/030197/00		CAP 100PF 5% 160V HS SUFLEX	1	EA	C2
124	CS/030479/00			0		* ALTN TO ITEM 123
125	CS/031629/00		CAP 560PF 5% 100V HS560/5-10/	1	EA	C14
126	CS/031630/00		CAP 560PF 5% 160V KSN 1SCRA	0	EA	* ALTN TO ITEM 125
127	CS/004149/00		CAP 4700PF 5% 160V HS SUFLEX	1	EA	C6
128	CS/031636/00			0		* ALTN TO ITEM 127

PARTS LIST 084260/00 ISSUE 05 C.N. 08889 DATE 12/03/79 C>SERVO PCB ASSY SE 6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
129	CS/032665/00		CAP 6800PF 20% 400V FKS WIMA	1	EA	C18
130	CS/032666/00		CAP 6800PF 20% 400V 347-51682	0	EA	* ALTN TO ITEM 129
131	CS/030309/00		CAP 0.01MFD +25%-50% 25V ERIE	5	EA	C9,10,15,16,19
132	CS/031721/00		CAP 0.01MF 10% 100V 8131M100	0	EA	* ALTN TO ITEM 131
133	CS/032731/00		CAP 0.047MF 10% 100V 344-25473	1	EA	
134	CS/031589/00		CAP 0.047MF 10% 250V MKS WAYC	0	EA	* ALTN TO ITEM 133
135	CS/032217/00		CAP 0.1MF -20<50% 25V 811-T-25	1	EA	C3
136	CS/031691/00		CAP 0.1MF +80-20% 30V 1SP LEM	0	EA	* ALTN TO ITEM
137	CS/031592/00		CAP 0.10MFD 10% 100V 344-21104	4	EA	C1,4,7,11
138	CS/031593/00		CAP 0.10MF 10% 100V MKS WAYCOM	0	EA	* ALTN TO ITEM
139	CS/032664/00		CAP 1MFD 10% 250V MKS WIMA	2	EA	C21,22
140	CS/031669/00		CAP 1.0MF 10% 250V 344-41105	0	EA	* ALTN TO ITEM
141	CS/031604/00		CAP 2.2MFD 10% 100V 344-21225	1	EA	C5
142	CS/031605/00		CAP 2.2MF 10% 100V MKS WAYCOM	0	EA	* ALTN TO ITEM
143	CS/031308/00		CAP 47MF +50-10% 63V 016-1847	1	EA	C17
144	CS/031567/00		CAP 47MF +50-10% 63V TR63V47M	0	EA	* ALTN TO ITEM
145	CS/030853/00		CAP 220MFD +50%-10% 16V 016/MU	2	EA	C20,28
146	CS/031571/00		CAP 220MF +50-10% 16V NOVEA	0	EA	* ALTN TO ITEM
147	CS/030837/00		CAP 0.1MF 10% 250V 344-41104MU	1	EA	C13
148	CS/004739/00			0		* ALTN TO ITEM
149	CS/031778/00		CAP 0.047MF 10% 250V MKC10 WAY	1	EA	C23
150	CS/032268/00		CAP 47MF 25V TAP 47/25	2	EA	C24,25
151	BS/003461/00		TRANSISTOR BC182KB TEXAS	7	EA	TR2,4,5,7,9,11,13
152	CS/032394/00		CAP 47MFD 20% 25V K47T25MA	0	EA	* ALTN TO ITEM 150
153	BS/003436/00		BC 212B TRANSISTOR	4	EA	TR1,8,10,12

PARTS LIST 084260/00 ISSUE 05 C.N. 08889 DATE 12/03/79 C>SERVO PCB ASSY SE 6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
155	BS/005454/00		F.E.T SWITCH 2N4092 NATIONAL	2	EA	TR3,6
156	BS/005455/00		F.E.T N.CHN 2N4092 MOTOROLA	0	EA	* ALTN TO ITEM 155
157	BS/005452/00		TRANSISTOR 2N5401 FAIRCHILD	2	EA	TR14,16
158	BS/005453/00		TRANSISTOR 2N5401 MOTOROLA	0	EA	* ALTN TO ITEM 157
159	BS/005456/00		TRANSISTOR BUX66 R.C.A	1	EA	TR17
160	BS/005457/00		TRANSISTOR 2N6420 MOTOROLA	0	EA	* ALTN TO ITEM 159
161	BS/003468/00		Z DIODE 30V 5% 400M/W BZY88C30	1	EA	D1
162	BS/005451/00		DIODE BY332 MOTOROLA	2	EA	D13,18
164	BS/003100/00		DIODE 1A 800V IN4006 TEXAS	2	EA	D19,20
166	BS/003177/00		DIODE 10M/A 75V 1N4148 MULLARD	14	EA	D2-12,14,15,17
167	BS/002045/00		DIODE 10M/A 100V 1N914 TRANSIT	0	EA	* ALTN TO ITEM 167
168	BS/002983/00		I/C SN72723L TEXAS ONLY	1	EA	IC1
170	BS/005257/00		I/C SN72741P OPEN MARKET	2	EA	IC2,8
174	BS/005041/00		IC LM308AN OPEN MARKET	1	EA	IC4
176	BS/005459/00		I/C MC1458P1 MOTOROLA ONLY	1	EA	IC5
177	BS/005460/00		I/C UA1458CTC FAIRCHILD ONLY	0	EA	* ALTN TO ITEM 176
178	BS/005029/00		I/C SN72311P OPEN MARKET	1	EA	IC6
181	BS/005256/00		I/C SN72748P OPEN MARKET	1	EA	IC7
183	BS/005458/00		I/C LM3900N NATIONAL ONLY	1	EA	IC9
185	BS/003564/00		SOCKET 16 PIN DIL C 931602	1	EA	FOR ITEM 211
186	BS/005369/00		SKT DIL 16PIN ICL-163-56-G	0	EA	* ALTN TO ITEM 185
187	RS/023133/00		FUSEHOLDER L1426	1	EA	
188	BS/005061/00		TRANSISTOR MTG PAD MON10/LF	1	EA	FOR MTG IC1
189	RS/023160/00		FUSE ANTI-SURGE 100MA F286	1	EA	FS1
191	GS/011231/00		TOROID CORE MM627/K4(MULLARD)	1	EA	FOR L1

PARTS LIST 084260/00 ISSUE 05 C.N. 08889 DATE 12/03/79 C>SERVØ PCB ASSY SE 6300
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IT	COMP. NUMBER	S	STØCK DESCRIPTIØN	QTY	UN	NØTES
192	LS/016547/00		WIRE 7/0.2 6-12-PT6-T1 VIØLET	0	M	50 MM,FØR L1
193	KS/015494/00		PIN -75404/002 BERG	23	EA	FØR TP 1-17,LK1,LK2
194	KS/015007/00		TERMINAL LUG H2072Z HARWIN	11	EA	FØR TL1-11
195	NS/020145/00		DIØDE CAP CRADLE TØ DRG A84340	22	EA	FØR D1-15,17-20,C2,8,14
196	AS/002504/00		CØNN SØLDER TAIL HEA.3495-1002	1	EA	PL18
198	AS/002257/00		CØNNECTØR 25WAY DB25P1A1N ITT	1	EA	PL4
199	AS/002456/00		CØNN 25W PLUG DB-25R-022	0	EA	* ALTN TØ ITEM 198
200	KS/015826/00		LINK 65771-001 BERG	2	EA	LK1,2
202	YS/040760/00		SC SLT PAN M3 8 ST.ST	2	EA	
203	YS/040324/00		SC SLT PAN M3 10 ST.S	2	EA	
205	YS/040385/00		NUT HEX FULL M3 MSZP	4	EA	
207	YS/040461/00		WASHER CRINKLE M3 BCUCP	4	EA	
209	LS/017537/00		TY-RAP. TY-23M. T.BETTS	1	EA	
211	BS/005461/00		I/C DG508CJ SILICØNIX ØNLY	1	EA	IC3
212	AS/002241/00		PLUG Q-MATE SMS-3P-B1 B-BURNDY	1	EA	PL23
213	AS/002534/00		FØRMED PIN SM24M-1-DJ8-BL BICC	3	EA	
214	LS/016568/00		CAB PVC TWIN SCRND 7/0.2 R/BU	0	M	200MM LG
215	LS/017121/00		PVC WIRE 7/0.2 TYPE 2 BLACK	0	M	200MM LG
216	ØS/020079/00		SLEEVE H30X1/2 LG BLACK	2	EA	
217	KS/015240/00		W.PIN TYPE H2088	2	EA	
900				0		NØTE- ITEM 211 IS AN M.Ø.S. DEVICE

PARTS LIST 087885/00 ISSUE 10 C.N. 09500 DATE 06/06/80 D>SERVO PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE- THIS PL ASSY TO DRG NO.D84260
T02				0		CIRCUIT DIAGRAM E84261
002	PL/091079/00			1		AUTO-INSERTED PCB ASSY
015				0		MOD.RECORD SHEET A87899 REF.ONLY
101	DS/036244/00		R 100R 5% 6W W22 WELWYN	1	EA	R99
103	DS/034304/00		R 4K7 5% 2.5W W21 WELWYN	1	EA	R87
106	FS/010829/00		POT 5000HM 10% 0.5W 85W	1	EA	RV1
107	FS/010802/00		POT 500R 10% 0.5W 3299W-1-501	0	EA	* ALTN TO ITEM 106
108	FS/010828/00		POT 10K 10% 0.5W 85W	1	EA	RV2
109	FS/010830/00		POT 10K 10% 0.5W 3299W-1-103	0	EA	* ALTN TO ITEM 108
119	CS/031600/00		CAP 0.68MF 10% 100V 344-21684	2	EA	C26,27
120	CS/031601/00		CAP 0.68MF 10% 100V MKS WAYCOM	0	EA	* ALTN TO ITEM 119
121	CS/031620/00		CAP 33PF 5% 160V HS33/5-10/160	1	EA	C8
122	CS/031621/00			0		* ALTN TO ITEM 121
123	CS/030197/00		CAP 100PF 5% 160V HS SUFLEX	1	EA	C2
124	CS/030479/00			0		* ALTN TO ITEM 123
125	CS/030252/00		CAP 220PF 10% 160V HS SUFLEX	1	EA	C32
126	CS/004135/00		CAP 2200PF 10% 160V HS SUFLEX	1	EA	C14
127	CS/004149/00		CAP 4700PF 5% 160V HS SUFLEX	1	EA	C6
128	CS/031636/00			0		* ALTN TO ITEM 127
129	CS/032665/00		CAP 6800PF 20% 400V FKS WIMA	1	EA	C18
130	CS/032666/00		CAP 6800PF 20% 400V 347-51682	0	EA	* ALTN TO ITEM 129
131	CS/030309/00		CAP 0.01MFD +25%-50% 25V ERIE	3	EA	C15,16,19
132	CS/031721/00		CAP 0.01MF 10% 100V 8131M100	0	EA	* ALTN TO ITEM 131
133	CS/032841/00		CAP 0.047MF 10% 250V 344-41473	1	EA	C12

PARTS LIST 087885/00 ISSUE 10 C.N. 09500 DATE 06/06/80 D>SERVO PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
134	CS/031589/00		CAP 0.047MF 10% 250V MKS WAYC	0	EA	* ALTN TO ITEM 133
135	CS/032217/00		CAP 0.1MF -20<50% 25V 811-T-25	1	EA	C3
136	CS/031691/00		CAP 0.1MF +80-20% 30V 1SP LEM	0	EA	* ALTN TO ITEM 135
137	CS/031592/00		CAP 0.10MFD 10% 100V 344-21104	6	EA	C1,4,7,11,30,31
138	CS/031593/00		CAP 0.10MF 10% 100V MKS WAYCOM	0	EA	* ALTN TO ITEM 137
139	CS/032664/00		CAP 1MFD 10% 250V MKS WIMA	3	EA	C21,22,29
140	CS/031669/00		CAP 1.0MF 10% 250V 344-41105	0	EA	* ALTN TO ITEM 139
141	CS/031604/00		CAP 2.2MFD 10% 100V 344-21225	1	EA	C5
142	CS/031605/00		CAP 2.2MF 10% 100V MKS WAYCOM	0	EA	* ALTN TO ITEM 141
143	CS/031308/00		CAP 47MF +50-10% 63V 016-1847	1	EA	C17
144	CS/031567/00		CAP 47MF +50-10% 63V TR63V47M	0	EA	* ALTN TO ITEM 143
145	CS/030853/00		CAP 220MFD +50%-10% 16V 016/MU	2	EA	C20,28
146	CS/031571/00		CAP 220MF +50-10% 16V NOVEA	0	EA	* ALTN TO ITEM 145
147	CS/030837/00		CAP 0.1MF 10% 250V 344-41104MU	1	EA	C13
148	CS/004739/00			0		* ALTN TO ITEM 147
149	CS/031778/00		CAP 0.047MF 10% 250V MKC10 WAY	1	EA	C23
150	CS/032268/00		CAP 47MF 25V TAP 47/25	4	EA	C24,25,9,10
151	BS/003461/00		TRANSISTOR BC182KB TEXAS	7	EA	TR2,4,5,7,9,11,13
152	CS/032394/00		CAP 47MFD 20% 25V K47T25MA	0	EA	* ALTN TO ITEM 150
153	BS/003436/00		BC 212B TRANSISTOR	4	EA	TR1,8,10,12
155	BS/005454/00		F.E.T SWITCH 2N4092 NATIONAL	2	EA	TR3,6
156	BS/005455/00		F.E.T N.CHN 2N4092 MOTOROLA	0	EA	* ALTN TO ITEM 155
157	BS/005452/00		TRANSISTOR 2N5401 FAIRCHILD	2	EA	TR14,16
158	BS/005453/00		TRANSISTOR 2N5401 MOTOROLA	0	EA	* ALTN TO ITEM 157
159	BS/005456/00		TRANSISTOR BUX66 R.C.A	1	EA	TR17

PARTS LIST 087885/00 ISSUE 10 C.N. 09500 DATE 06/06/80 D>SERVO PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
160	BS/005457/00		TRANSISTOR 2N6420 MOTOROLA	0	EA	* ALTN TO ITEM 159
163	BS/005996/00		DIODE LOW LEAKAGE JPAD50 SILIC	1	EA	D7
167	BS/002045/00		DIODE 10M/A 100V 1N914 TRANSIT	0	EA	* ALTN TO ITEM 166
168	BS/005971/00		I.C. MC1723CG MOTOROLA ONLY	1	EA	IC1
174	BS/005041/00		IC LM308AN OPEN MARKET	1	EA	IC4
187	RS/023133/00		FUSEHOLDER L1426	1	EA	
189	RS/023160/00		FUSE ANTI-SURGE 100MA F286	1	EA	FS1
191	GS/011231/00		TOROID CORE MM627/K4(MULLARD)	1	EA	FOR L1
192	LS/016547/00		WIRE 7/0.2 6-12-PT6-T1 VIOLET	0	M	50 MM,FOR L1
193	KS/015700/00		PIN -75401/002 BERG.	17	EA	FOR TP1-17,LK1,2
194	KS/015007/00		TERMINAL LUG H2072Z HARWIN	11	EA	FOR TL1-11
195	BS/003135/00		DIODE HOLDER A1136 JERMYN	1	EA	FOR C32
196	AS/002504/00		CONN SOLDER TAIL HEA.3495-1002	1	EA	PL18
197	AS/002618/00		WAFER ASS:Y LOCKING E5046-03AG	1	EA	PL23
198	AS/002257/00		CONNECTOR 25WAY DB25P1A1N ITT	1	EA	PL4
199	AS/002456/00		CONN 25W PLUG DB-25R-022	0	EA	* ALTN TO ITEM 198
200	KS/015826/00		LINK 65771-001 BERG	2	EA	LK1,2
202	YS/040760/00		SC SLT PAN M3 8 ST.ST	2	EA	
203	YS/040324/00		SC SLT PAN M3 10 ST.S	2	EA	
205	YS/040385/00		NUT HEX FULL M3 MSZP	4	EA	
207	YS/040461/00		WASHER CRINKLE M3 BCUCP	4	EA	
209	LS/017537/00		TY-RAP. TY-23M. T.BETTS	1	EA	
210	KS/015700/00		PIN -75401/002 BERG.	6	EA	
900				0		NOTE- ITEM 211 IS AN M.O.S. DEVICE

PARTS LIST 084239/00 ISSUE 01 C.N. DATE 09/10/78 C>CONTROL PANEL PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE-THIS PL.ASSEMBLE TO DRG. D84239
T02				0		CIRCUIT DIAGRAM E84231 (PART)
001	084240/00		D PCB.DRILLED	1	EA	FROM D84240/01/02/03/05
008	QS/022602/00		SWITCH PUSH BUTTON (WB)MPD ITT	10	EA	S1-10 SUPPLIED WITHOUT BUTTONS
010	BS/005421/00		L.E.D YL XC5053-YELLOW XCITON	3	EA	D19,20,24.
012	BS/005420/00		L.E.D GN XC5053-GREEN XCITON	21	EA	D1-18,21,22,23.
014	AS/002326/00		FLEXI-CONN SIDE ENT HBLB 18R1	2	EA	FC1,2.

PARTS LIST 084232/00 ISSUE 04 C.N. 08726 DATE 22/11/78 C>CONTROL LOGIC PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
T01				0		NOTE- THIS PL ASSY TO DRG D84232
T02				0		CIRCUIT DIAGRAM NO. E84231
001	084236/00		E PCB DRILLED	1	EA	MADE FROM D84236/01/02/03/05
007	BS/002982/00		I/C SN72748P TEXAS ONLY	1	EA	IC55
008	BS/005373/00		I/C MC1488L MOTOROLA ONLY	2	EA	IC21,40.
009	BS/005374/00		I/C MC1488N SIGNETICS ONLY	0	EA	* ALTN TO ITEM 8
010	BS/005375/00		I/C MC1489L MOTOROLA ONLY	4	EA	IC36,41,54,32.
011	BS/005376/00		I/C MC1489N SIGNETICS ONLY	0	EA	* ALTN TO ITEM 10
012	BS/005377/00		I/C MC75492P MOTOROLA ONLY	4	EA	IC19,20,45,53.
013	BS/005378/00		I/C DM75492P NAT SEMIC ONLY	0	EA	* ALTN TO ITEM 12
014	BS/005419/00		I/C NE555P TEXAS ONLY	2	EA	IC13,22.
015	BS/003441/00		I/C TIMER NE555V SIGNETS ONLY	0	EA	* ALTN TO ITEM 14
017	DS/033996/00		R 10R 5% 1/4W CR25 MULLARD	3	EA	R81,82,83.
018	DS/007506/00		RES 10R0 5% 1/4W TR4	0	EA	* ALTN TO ITEM 17
021	DS/033837/00		R 100R 5% 1/4W CR25 MULLARD	10	EA	R2,35,36,39,41,43,45,47,78,92.
022	DS/007207/00			0		* ALTN TO ITEM 21
023	DS/034015/00		R 390R 5% 1/4W CR25 MULLARD	24	EA	R12-19,R21-33,R86,87,95.
024	DS/006597/00		R 390R 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 23
025	DS/033944/00		R 560R 5% 1/4W CR25 MULLARD	1	EA	R66
026	DS/006845/00		R 560R 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 25
027	DS/033876/00		R 1K 1% 0.4W 50PPM MR25/VTM	8	EA	R20,49,58,89,98,99,102,104
030	DS/034892/00		RES 2K 1% 0.4W 100PPM MR25	3	EA	R48,90,101.
031	DS/033947/00		R 2K2 5% 1/4W CR25 MULLARD	3	EA	R59,63,64.
032	DS/006506/00		R 2K2 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 31
033	DS/033948/00		R 2K7 5% 1/4W CR25 MULLARD	2	EA	R74,85.

PARTS LIST 084232/00 ISSUE 04 C.N. 08726 DATE 22/11/78 C>CONTROL LOGIC PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
034	DS/033993/00		R 3K3 5% 1/4W CR25 MULLARD	1	EA	R88.
035	DS/006930/00		RES 3K3 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 34
036	DS/034029/00		R 5K6 5% 1/4W CR25 MULLARD	14	EA	R3-11,R55,56,76,79,91.
037	DS/007386/00		RES.5K6 5% 1/4W TR4	0	EA	* ALTN TO ITEM 36
038	DS/033540/00		R 6K81 1% 0.4W 50PPM MR25/VTM	1	EA	R96.
039	DS/033951/00		R 10K 5% 1/4W CR25 MULLARD	7	EA	R53,67,70,72,94,97,103
040	DS/006714/00		RES 10K 5% 1/4W TR4	0	EA	* ALTN TO ITEM 39
041	DS/033953/00		R 15K 5% 1/4W CR25 MULLARD	2	EA	R50,51.
042	DS/007262/00		R 15K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 41
043	DS/033954/00		R 22K 5% 1/4W CR25 MULLARD	3	EA	R69,71,73.
044	DS/006925/00		R 22K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 43
045	DS/034919/00		R 274K 1% 0.4W 50PPM MR25/VTM	1	EA	R60
046	DS/034037/00		R 27K 5% 1/4W CR25 MULLARD	1	EA	R54
047	DS/034171/00		RES 27K 5% 1/4W TR4	0	EA	* ALTN TO ITEM 46
048	DS/034906/00		R 61K9 1% 0.4W 50PPM MR25/VTM	1	EA	R68
049	DS/033596/00		R 220K 2% 0.5W MR30 MULLARD	1	EA	R93
050	DS/007306/00		RES. 82K 5% 1/4W TR4	0	EA	* ALTN TO ITEM 49
051	DS/033836/00		R 100K 5% 1/4W CR25 MULLARD	7	EA	R57,62,65,75,80,84,105
052	DS/007259/00		R 100K 5% 1/4W TR4 ELECTROSIL	0	EA	* ALTN TO ITEM 51
053	DS/033958/00		R 150K 5% 1/4W CR25 MULLARD	1	EA	R61.
054	DS/007971/00		RES 150K 5% 1/4W TR4	0	EA	* ALTN TO ITEM 53
056	DS/034932/00		RES. 909K 1% 0.5W 100 PPM MR30	1	EA	R100.
057	DS/033962/00		R 1M 5% 1/4W CR25 MULLARD	10	EA	R1,34,37,38,40,42,44,46,52,77.
059	FS/010807/00		TRIMPOT.50K. 85W. MORGANITE	1	EA	RV1.
060	FS/010803/00		POT 50K 10% 0.5W 3299W-1-503	0	EA	* ALTN TO ITEM 59

PARTS LIST 084232/00 ISSUE 04 C.N. 08726 DATE 22/11/78 C>CONTROL LOGIC PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
061	CS/004994/00		CAP 1000PF 5% 160V HS SUFLEX	6	EA	C77-82
062	CS/004149/00		CAP 4700PF 5% 160V HS SUFLEX	1	EA	C22
064	CS/030197/00		CAP 100PF 5% 160V HS SUFLEX	15	EA	C2-10,C19,20,21,28,30,42.
066	CS/030019/00		CAP 470PF 5% 160V HS SUFLEX	1	EA	C27
068	CS/004731/00		CAP 1500PF 5% HS1500-5-15-160	5	EA	C26,39,40,45,46.
070	CS/032497/00		CAP 0.047MFD +50%-25% 811-T-40	1	EA	C25.
071	CS/032217/00		CAP 0.1MF -20<50% 25V 811-T-25	4	EA	C31-34.
072	CS/030741/00		CAP .1MF 5% 100V MKS	10	EA	C1,C11-16,C18,29,44
074	CS/031601/00		CAP 0.68MF 10% 100V MKS WAYCOM	1	EA	C43.
076	CS/004773/00		CAP 1MF 5% 63V MKS	1	EA	C17.
078	CS/031306/00		CAP 15MFD +50%-10% 63V MULLARD	4	EA	C35-38.
079	CS/031565/00		CAP 15MF -10%<50% TR63V 15M	0	EA	* ALTN TO ITEM 78
080	CS/004745/00		CAP 68MFD +50%-10% 16V 016/MUL	1	EA	C41
081	CS/031568/00		CAP 68MF -10%<50% TR16V68M	0	EA	* ALTN TO ITEM 80
082	CS/030309/00		CAP 0.01MFD +25%-50% 25V ERIE	29	EA	C23,24,C50-76.
083	CS/031598/00		CAP 0.33MFD 10% 100V MKS WAYC	1	EA	C83
084	BS/002942/00		Z.DIODE 5.1V 5% 400M/W BZY88	1	EA	D25.
085	BS/003177/00		DIODE 10M/A 75V 1N4148 MULLARD	2	EA	D26,27.
086	BS/002045/00		DIODE 10M/A 100V 1N914 TRANSIT	0	EA	* ALTN TO ITEM 85
089	BS/003461/00		TRANSISTOR BC182KB TEXAS	7	EA	TR1,2,3,5,6,7,8.
090	BS/005366/00		TRANSISTOR BSX20 FAIRCHILD	1	EA	TR4.
091	BS/002599/00		TRANSISTOR BSX20 MULLARD	0	EA	* ALTN TO ITEM 90
094	BS/003116/00		MOUNTING PAD EPX-005 JERMYN	7	EA	FOR MTG.ITEM 89
095	BS/002420/00		MOUNTING PAD 10171 M.ROSS	0	EA	* ALTN TO ITEM 94
096	BS/002968/00		MOUNTING PAD TO5/18/002 JERMYN	1	EA	FOR MTG.ITEM 90

PARTS LIST 084232/00 ISSUE 04 C.N. 08726 DATE 22/11/78 C>CONTROL LOGIC PCB ASSY SE6300
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IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
097	BS/005371/00		TRANSISTOR MTG PAD 10042 M.ROS	0	EA	* ALTN TO ITEM 96
098	NS/020145/00		DIODE CAP CRADLE TO DRG A84340	25	EA	
100	BS/005404/00		I/C SKT LOW PROF C930802 TEXAS	3	EA	FOR ITEMS 7,14.
101	BS/005367/00		SKT DIL 8PIN ICL-083-56-G	0	EA	* ALTN TO ITEM 100
102	BS/003482/00		I/C SKT 14PIN PCB MTG C931402	33	EA	FOR CIRC.REFS,SEE ITEMS 900 & 901
103	BS/005368/00		SKT DIL 14PIN ICL-143-56-G	0	EA	* ALTN TO ITEM 102
104	BS/003564/00		SOCKET 16 PIN DIL C 931602	24	EA	FOR ITEMS 130,132,139,141,145,147.
105	BS/005369/00		SKT DIL 16PIN ICL-163-56-G	0	EA	* ALTN TO ITEM 104
107	KS/015826/00		LINK 65771-001 BERG	7	EA	LK1-7
108	KS/015494/00		PIN -75404/002 BERG	18	EA	LK1-7,ATP1-4.
109	AS/002298/00		FLEXI-CONNECTORS. UB-LB-18-51	2	EA	FC1,2.
110	OS/020494/00		P.T.F.E.SLEEVING TYPE TWT26	0	M	72MM.FOR ITEM 62,68(12MM.EACH)
124	BS/005566/00		I/C CD4001BE R.C.A ONLY	3	EA	IC2,24,48.
125	BS/005569/00		I/C MC14001BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 124.
126	BS/005567/00		I/C CD4011BE R.C.A ONLY	7	EA	IC10,15,37,47,51,58,31.
127	BS/005380/00		I/C MC14011BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 126.
128	BS/005568/00		I/C CD4012BE R.C.A ONLY	3	EA	IC11,17,39.
129	BS/005381/00		I/C MC14012BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 128.
130	BS/005382/00		I/C CD4017BE R.C.A ONLY	5	EA	IC49,59,60,56,57.
131	BS/005383/00		I/C MC14017BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 130
132	BS/005384/00		I/C CD4019BE R.C.A ONLY	2	EA	IC33,42.
133	BS/005422/00		I/C HEF4019BP MULLARD ONLY	0	EA	* ALTN TO ITEM 132
134	BS/005386/00		I/C CD4023BE R.C.A ONLY	5	EA	IC14,16,18,28,30.
135	BS/005387/00		I/C MC14023BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 134
139	BS/005388/00		I/C CD4027BE R.C.A ONLY	7	EA	IC5,7,8,9,12,27,29.

PARTS LIST 084232/00 ISSUE 04 C.N. 08726 DATE 22/11/78 C>CONTROL LOGIC PCB ASSY SE6300
****

IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
140	BS/005389/00		I/C MC14027BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 139
141	BS/005390/00		I/C CD4028BE R.C.A ONLY	2	EA	IC34,43.
142	BS/005391/00		I/C MC14028BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 140
143	BS/005392/00		I/C CD4047BE R.C.A ONLY	1	EA	IC46.
144	BS/005423/00		I/C HEF4047B MULLARD ONLY	0	EA	* ALTN TO ITEM 143
145	BS/005394/00		I/C CD4049AE R.C.A ONLY	4	EA	IC3,23,35,38.
146	BS/005570/00		I/C MC14049BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 145
147	BS/005395/00		I/C CD4050BE R.C.A ONLY	4	EA	IC25,26,44,52.
148	BS/005396/00		I/C MC14050BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 147
149	BS/005397/00		I/C CD4068BE R.C.A ONLY	1	EA	IC50
150	BS/005398/00		I/C MC14068BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 149
154	BS/005399/00		I/C CD4075BE R.C.A ONLY	1	EA	IC1.
155	BS/005400/00		I/C MC14075BCP MOTOROLA ONLY	0	EA	* ALTN TO ITEM 154
156	BS/005401/00		I/C MC14584BCP MOTOROLA ONLY	2	EA	IC4,6.
157	BS/005424/00		I/C CD40106BE R.C.A ONLY	0	EA	* ALTN TO ITEM 156
900				0		FOR ITEMS 8,10,12,124,126,128,134,
901				0		143,149,154,156.
902				0		NOTE-ITEMS 124-135,139-150,154-157,
903				0		ARE M.O.S DEVICES.

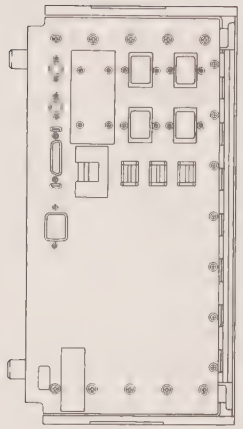
PARTS LIST 085925/00 ISSUE 02 C.N. 08620 DATE 23/10/78 C>ACCESSORIES KIT SE6300
****

IT	COMP. NUMBER	S	STOCK DESCRIPTION	QTY	UN	NOTES
001	085734/00		C DUST COVER	1	EA	
002	086727/00		B PLASTIC BAG	1	EA	MADE FROM WS60672
005	PL/044322/00		MAINS SOCKET WIRED	1	EA	
008	AS/001528/00		CONNECTOR MAS 5S	2	EA	
010	AS/001639/00		PLUG 25WAY DB25P	1	EA	
011	AS/001705/00		COVER PLASTIC DB51212/1 CANNON	1	EA	
012	AS/002520/00		END DISC LATCH ASSY	2	EA	
014	AS/002519/00		SOCKET FREE 12-WAY MULTICON	4	EA	
016	RS/023281/00		FUSE 6.3X32F 500/440 L693/.500	2	EA	FS4
017	RS/023285/00		FUSE LINK 3.15A TIME LAG SCHTR	4	EA	FS2 & 3
018	RS/023286/00		FUSE LINK 3.15A TIME LAG	0	EA	* ALTN TO ITEM 17
019	RS/023283/00		FUSE LINK FAST BLO L1427A/3.15	2	EA	FS1 (220V)
020	RS/023284/00		FUSE LINK 3.15A FAST BLO SCHTR	0	EA	* ALTN TO ITEM 19
021	RS/023280/00		FUSE 6.3A FAST BLOW L1427A/6.3	2	EA	FS1 (110V)
022	RS/023282/00		FUSE 6.3A SP001.1012 SCHURTER	0	EA	* ALTN TO ITEM 21
024	WS/060431/00		PLASTIC BAG 3"X3 1/4"TRANS PLA	1	EA	
028	MS/050087/00		INSTRUCTION MANUAL FOR SE6300	1	EA	

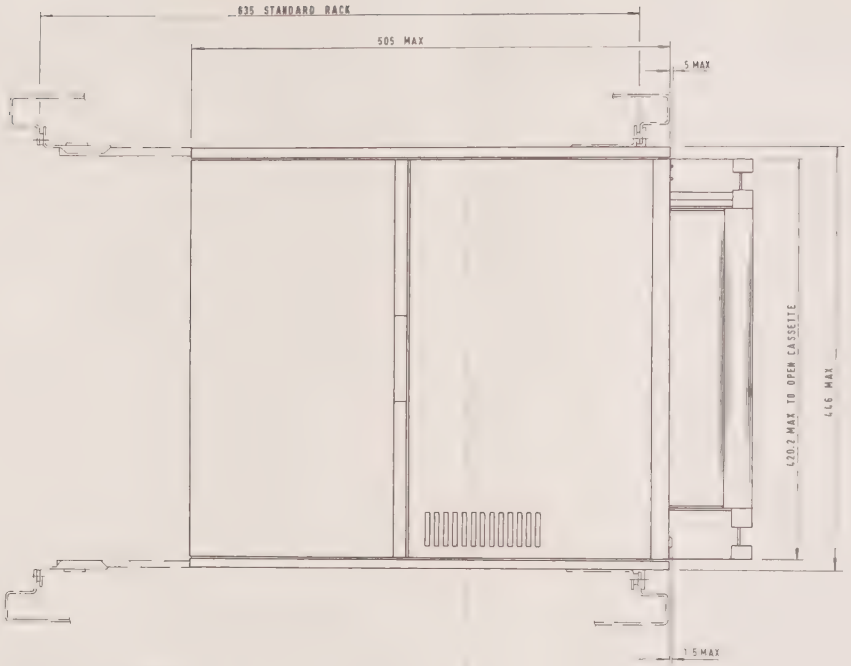
SECTION 9

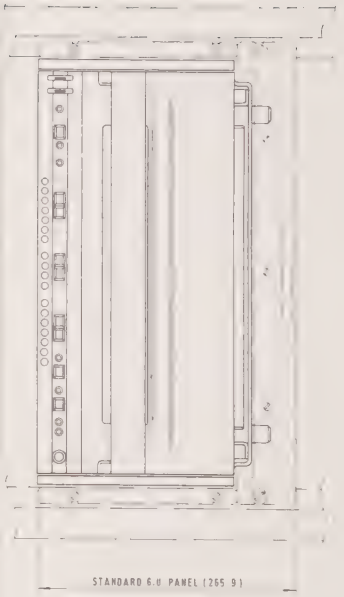
CIRCUIT & LAYOUT DRAWINGS

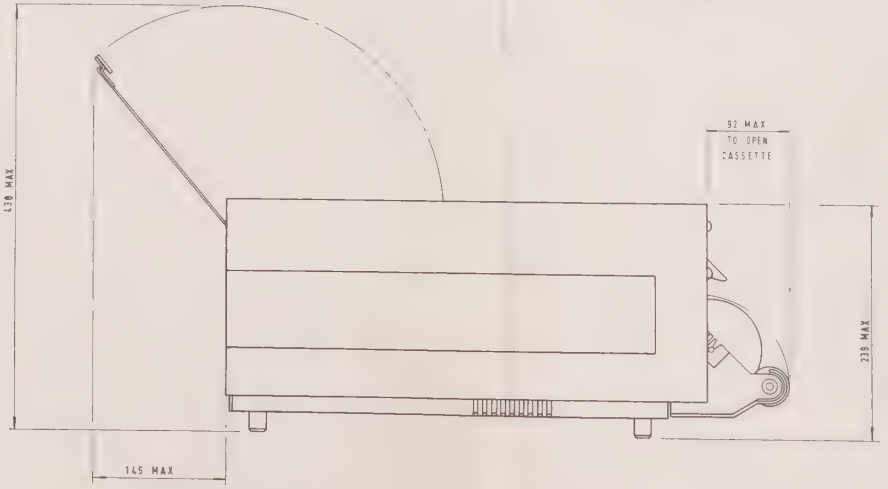
Fig No.	LIST OF DRAWINGS
1	Installation Diagram
2	Optical Parts and Drive Belts
3	Transformer Mounting Assembly
4	Power Supply Capacitor Chassis
5	Component Chassis Layout
6	Timer Board Layout
7	PSU and Lamp Regulator Layout
8	PSU,Lamp Regulator and Flash Circuit Diagram
9	Servo Board Layout
10	Servo Board Circuit Diagram
11	Control Logic Board Layout
12	Control Unit Circuit Diagram
13	Control Panel Layout
14	SE 6300 Interconnection Diagram



24 CHANNEL BACK PANEL LAYOUT

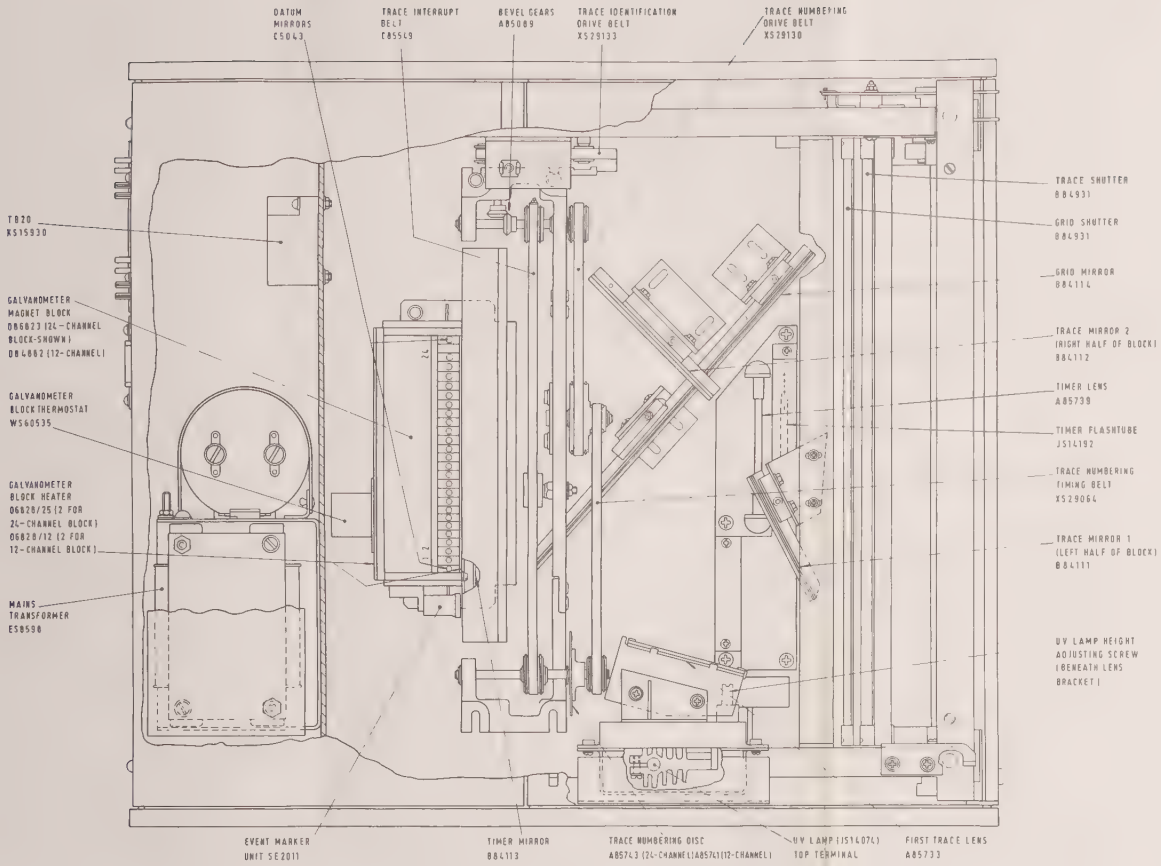






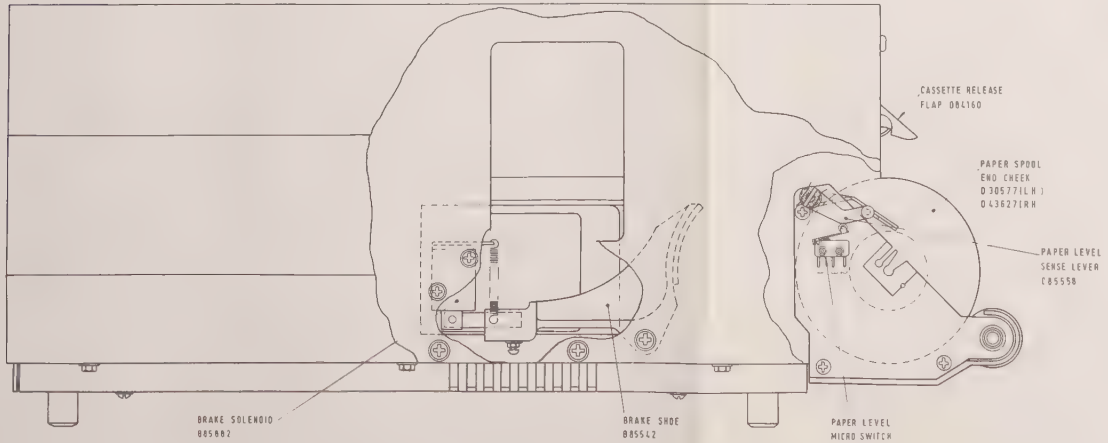
NOTE – ALL DIMENSIONS IN MILLIMETRES

INSTALLATION DIAGRAM FIG. 1
E86828
ISSUE


DATUM MIRRORS C5043
TRACE INTERRUPT BELT C85549
BEVEL GEARS A85089
TRACE IDENTIFICATION DRIVE BELT X529133
TRACE NUMBERING DRIVE BELT X529130
TB20 XS15930
GALVANOMETER MAGNET BLOCK 08G823 (24-CHANNEL BLOCK-SHOWN) 08G802 (12-CHANNEL)
GALVANOMETER BLOCK THERMOSTAT WS60535
GALVANOMETER BLOCK HEATER 06828/25 (2 FOR 24-CHANNEL BLOCK) 06828/12 (2 FOR 12-CHANNEL BLOCK)
MAINS TRANSFORMER ES8530
TRACE SHUTTER 88493)
GRID SHUTTER 88493)
GRID MIRROR 88411
TRACE MIRROR 2 (RIGHT HALF OF BLOCK) 88412
TIMER LENS A85739
TIMER FLASHTUBE JS14192
TRACE NUMBERING TIMING BELT X529064
TRACE MIRROR 1 (LEFT HALF OF BLOCK) 88411
UV LAMP HEIGHT ADJUSTING SCREW (BENEATH LENS BRACKET)
EVENT MARKER UNIT SE2011
TIMER MIRROR 88413
TRACE NUMBERING DISC A85743 (24-CHANNEL) A85741 (12-CHANNEL)
UV LAMP (JS14074) TOP TERMINAL
FIRST TRACE LENS A85733

TOP VIEW WITH CONTROL UNIT REMOVED

FRONT VIEW

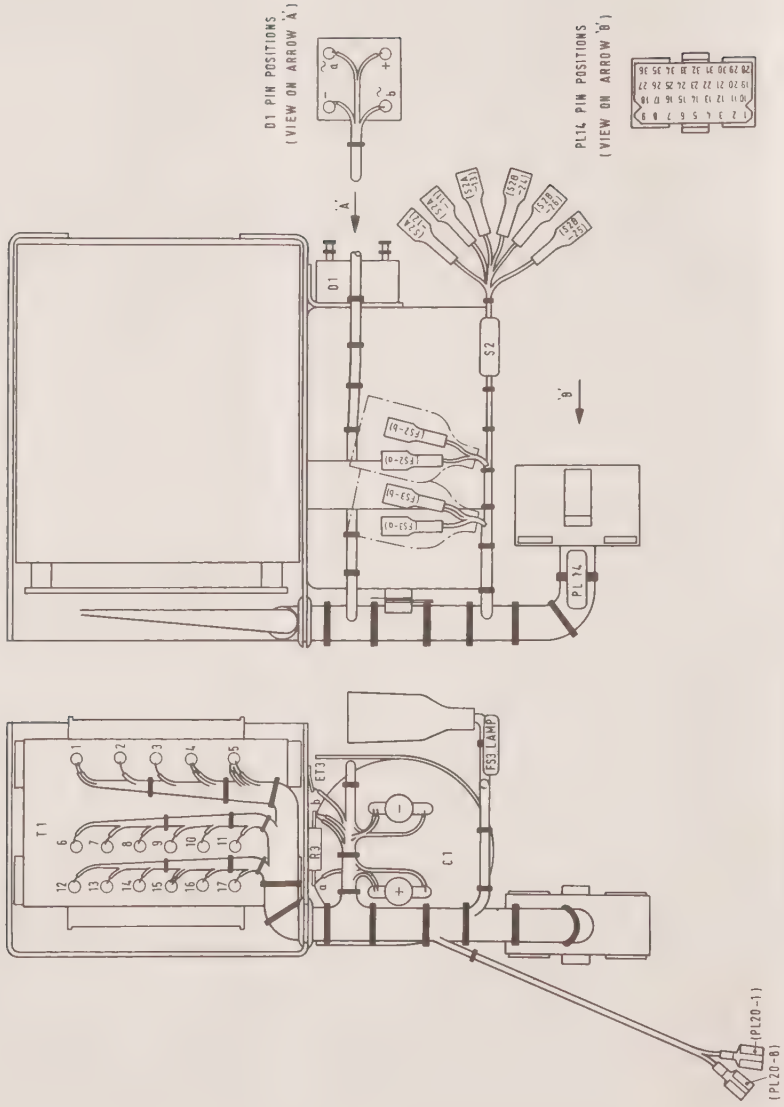

CASSETTE RELEASE FLAP 08416O
PAPER SPOOL END CHEEK D30577(LH) D43627(RH)
PAPER LEVEL SENSE LEVER C85558
BRAKE SOLENOID 885882
BRAKE SHOE 885542
PAPER LEVEL MICRO SWITCH QS22618

LEFT SIDE VIEW – CASSETTE OPEN

THIS DIAGRAM IS DERIVED FROM THE FOLLOWING SEL DRAWINGS

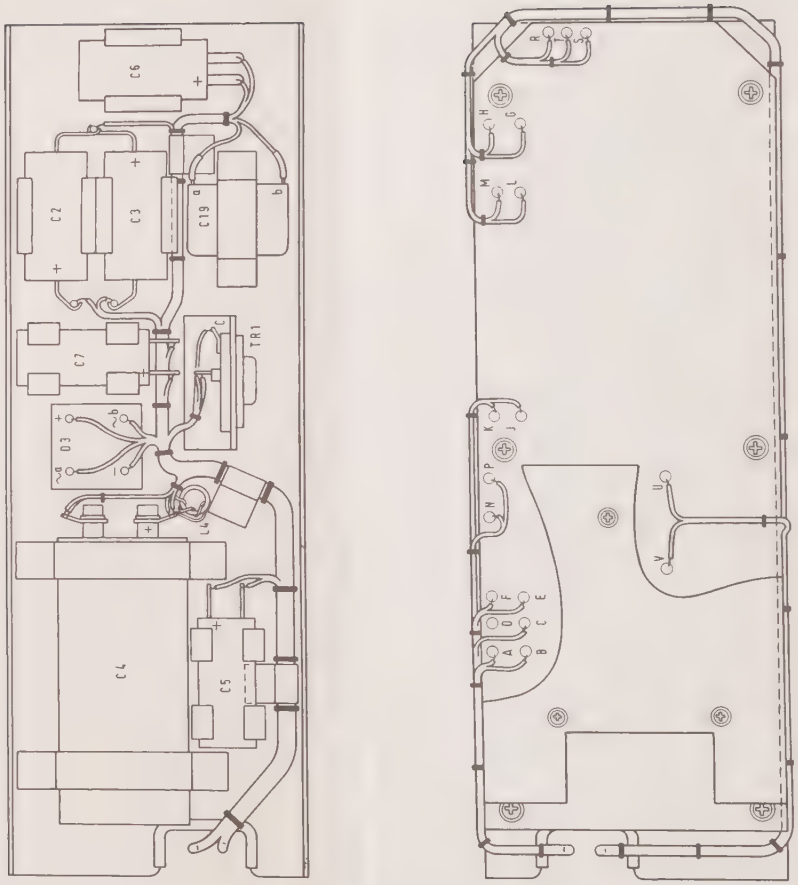
DRAWING No.	ISSUE
08415O	1
E84220	4
E84280	2
08430O	2
08430L	2
E85730	5
085918	2

OPTICAL PARTS AND DRIVE BELTS FIG. 2



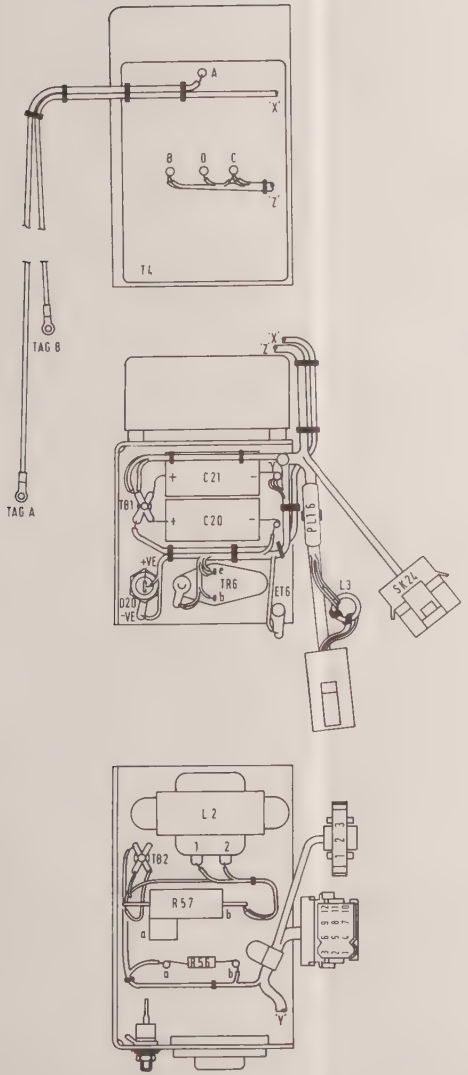
TRANSFORMER MOUNTING ASSEMBLY FIG. 3

COMPONENT LAYOUT D84289
ISSUE 1

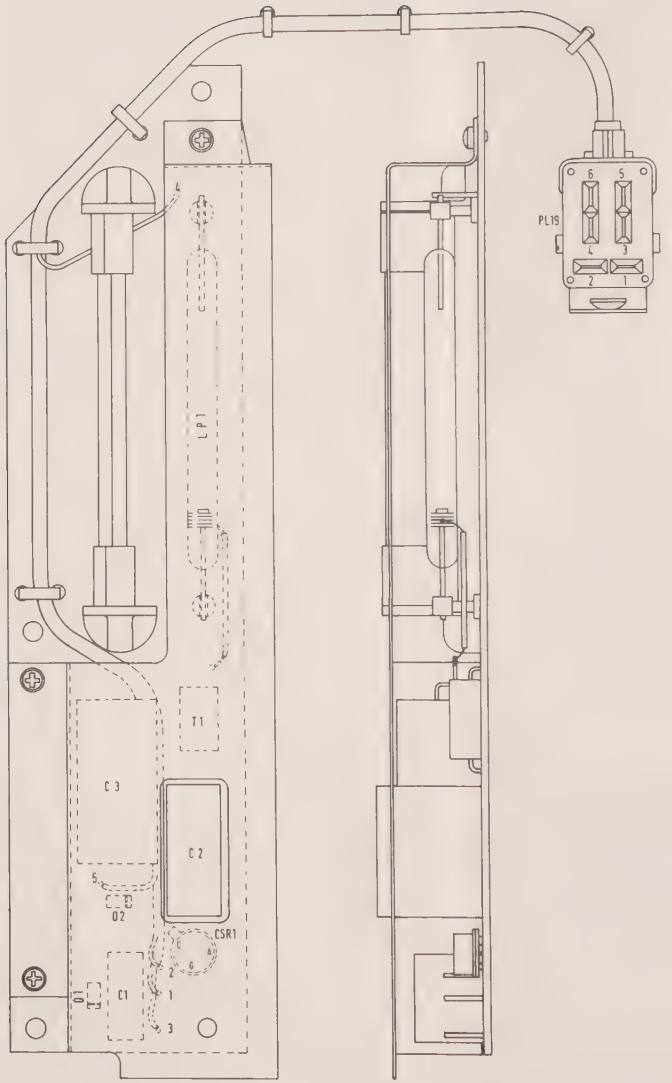


POWER SUPPLY (CAPACITOR) CHASSIS FIG. 4

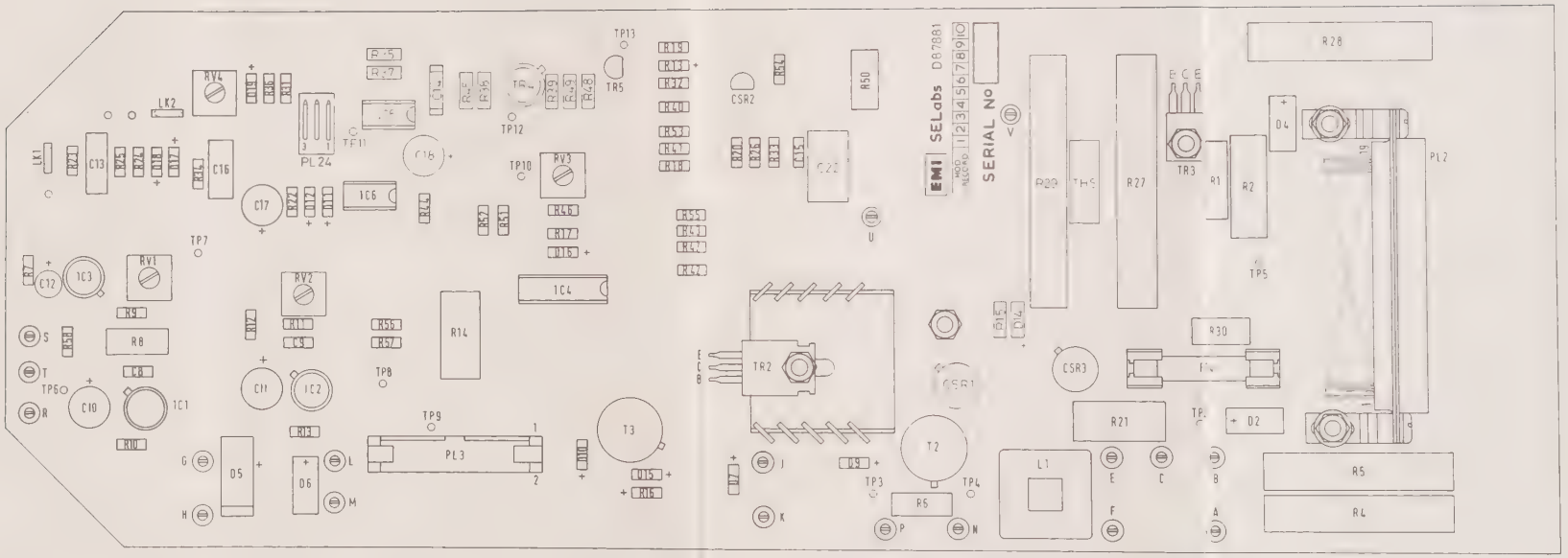
COMPONENT LAYOUT D85550
ISSUE 3



COMPONENT CHASSIS FIG. 5
COMPONENT LAYOUT C85380
ISSUE 3



TIMER BOARD FIG. 6
COMPONENT LAYOUT C85360
ISSUE 1

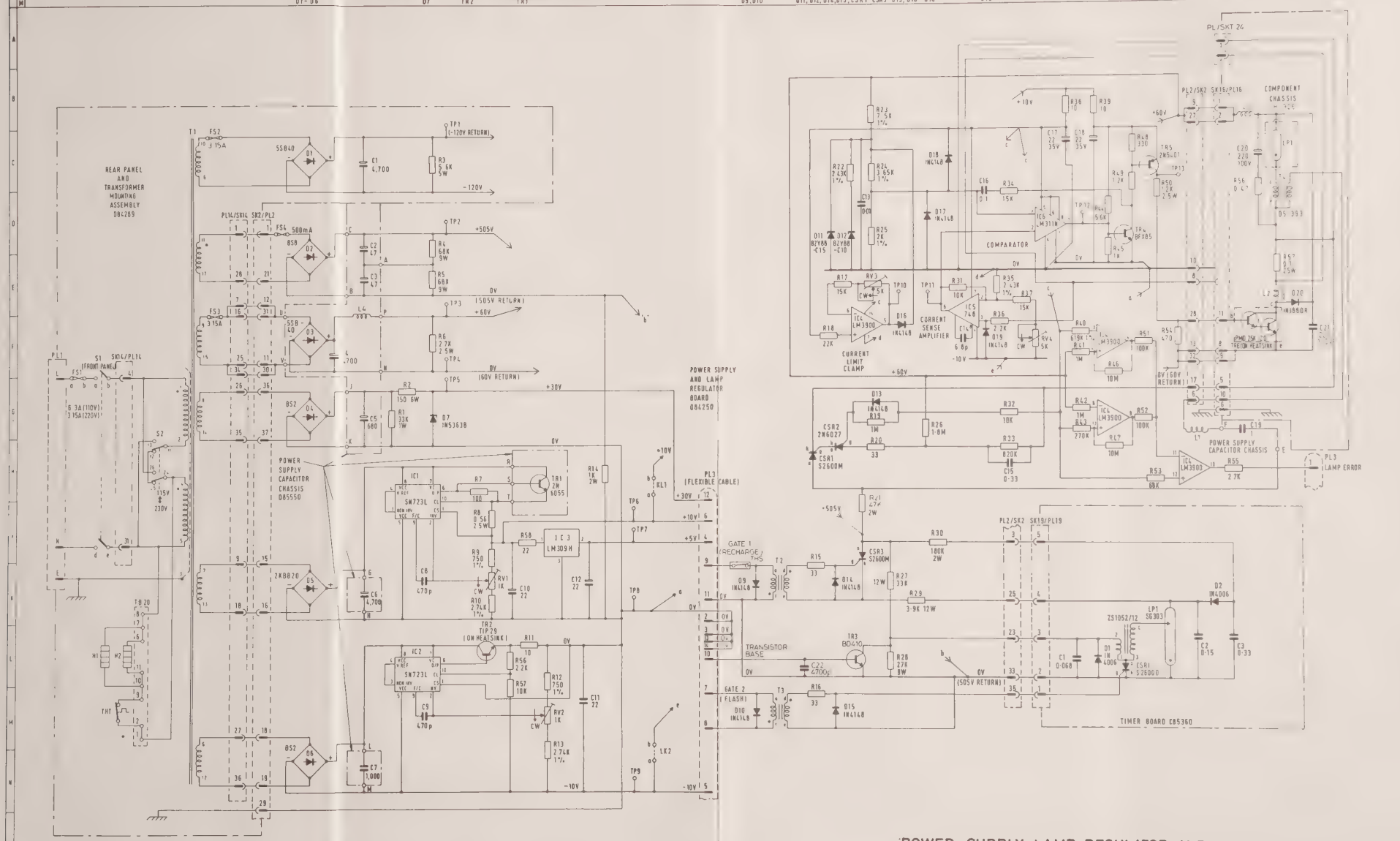


SE6300

POWER SUPPLY & LAMP REGULATOR BOARD FIG.7

COMPONENT LAYOUT D87881

ISSUE 2

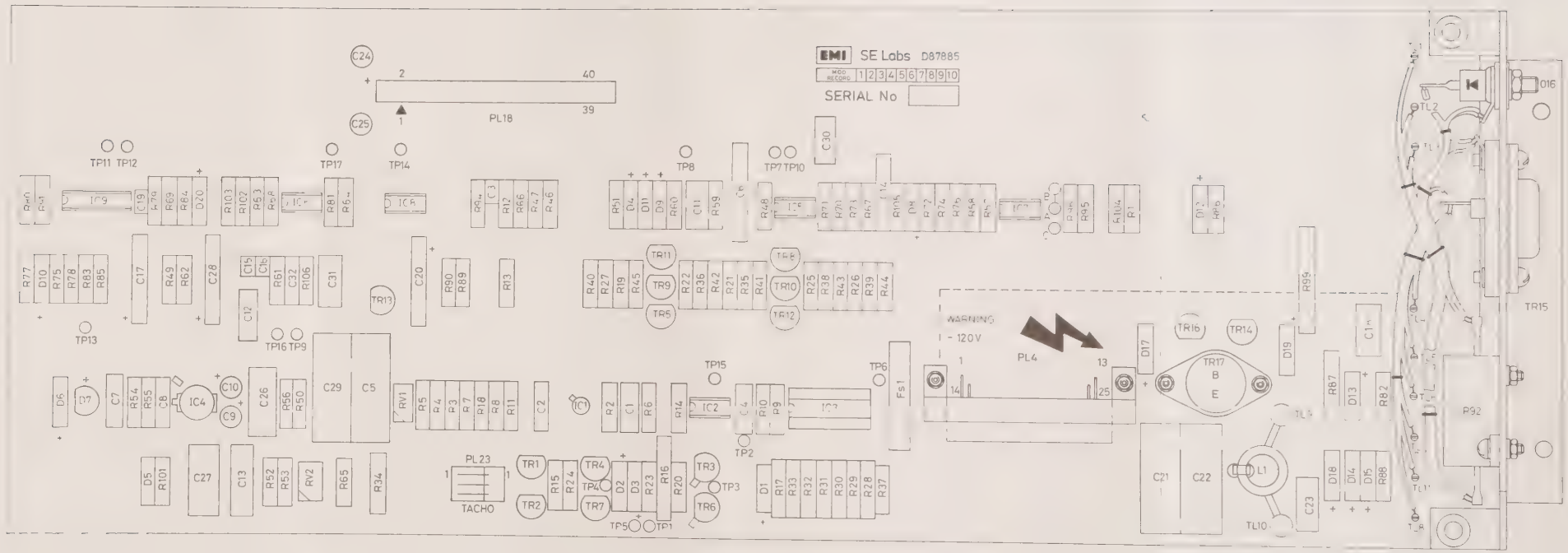


POWER SUPPLY, LAMP REGULATOR AND FLASH FIG. 8

CIRCUIT DIAGRAM E84251

ISSUE 7

SE 6300 TL No. 99/105/117



SE 6300

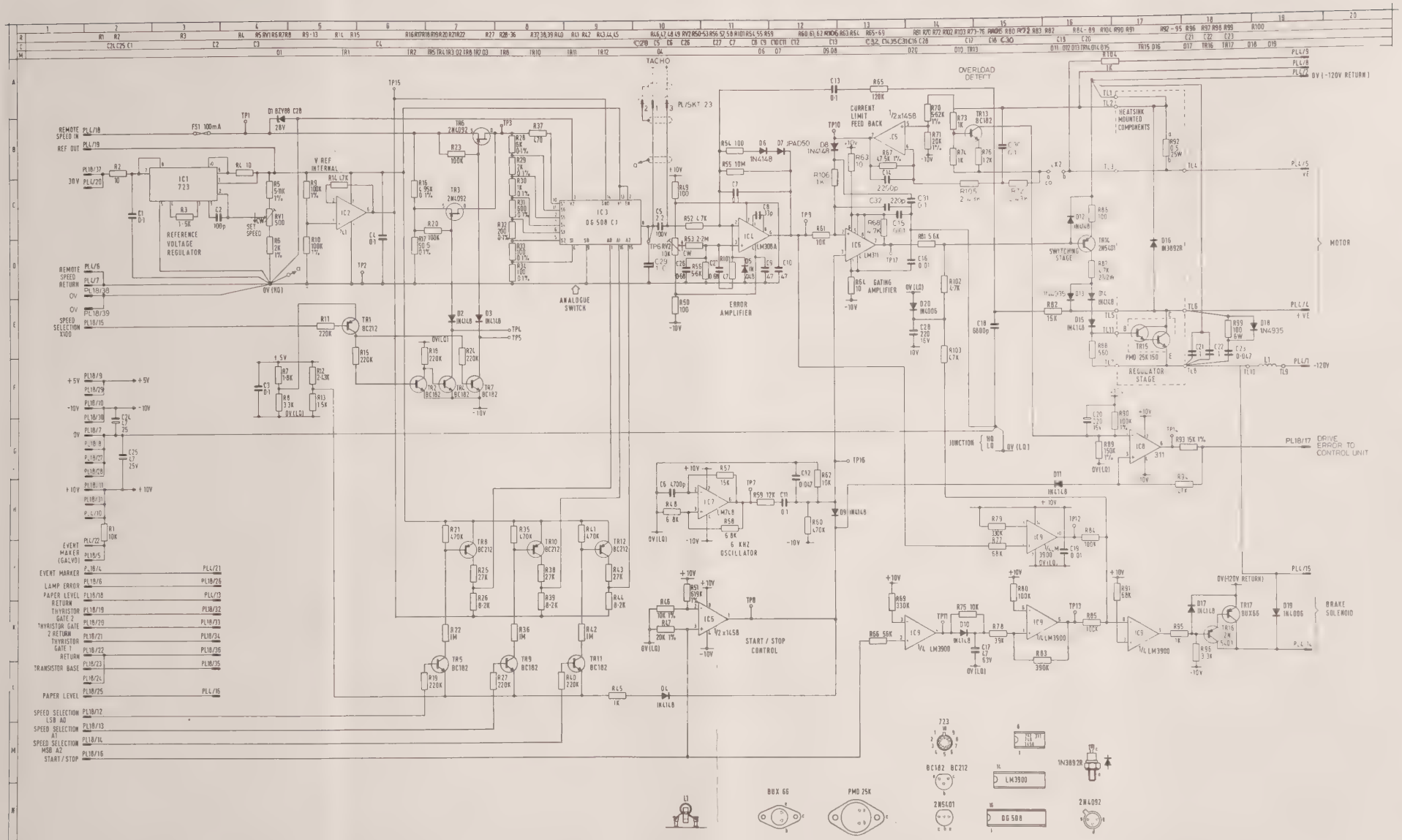
SERVO BOARD AND CHASSIS

COMPONENT LAYOUT

FIG. 9

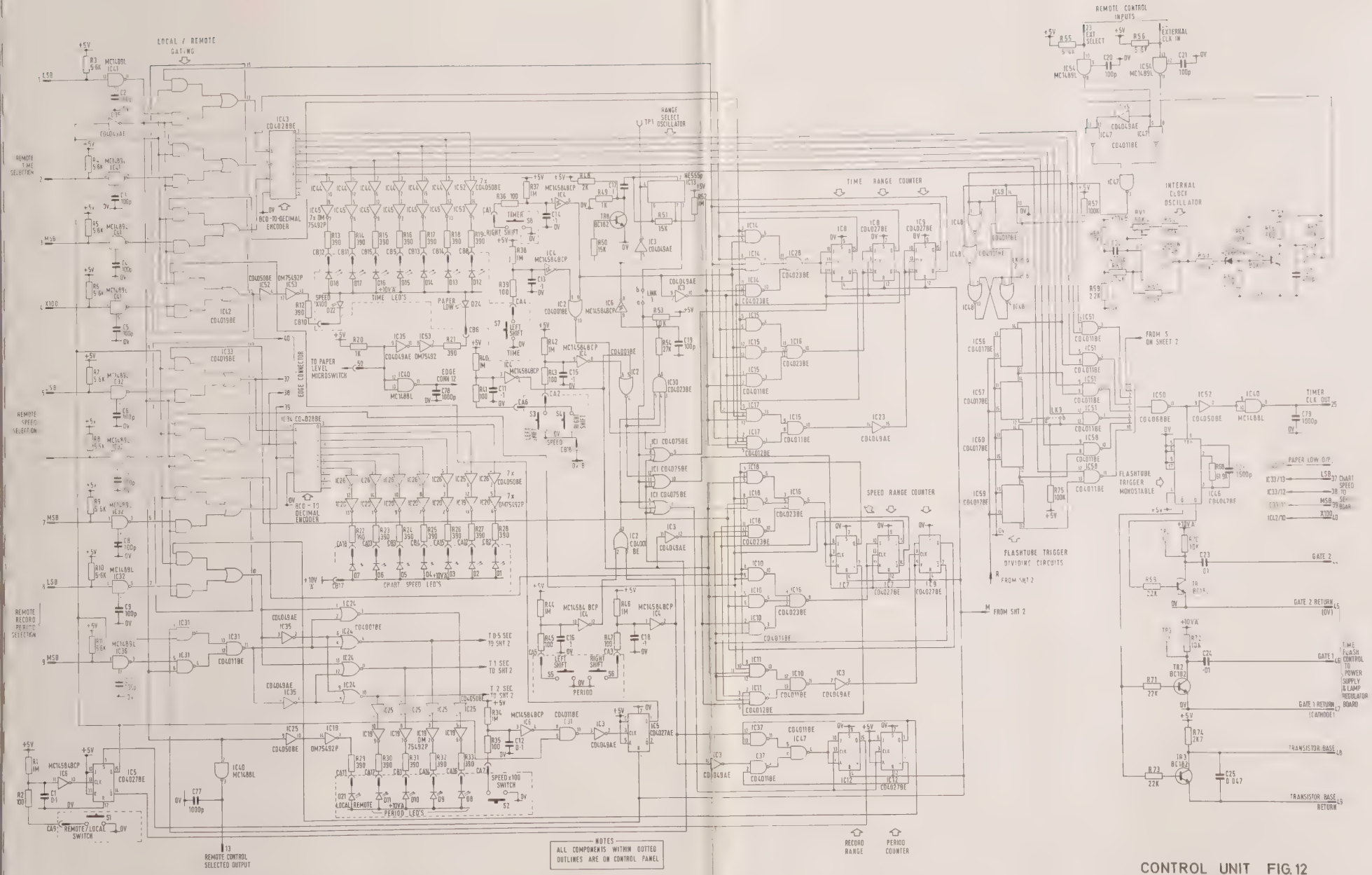
D87885 & C85750

ISSUE 7 ISSUE 1



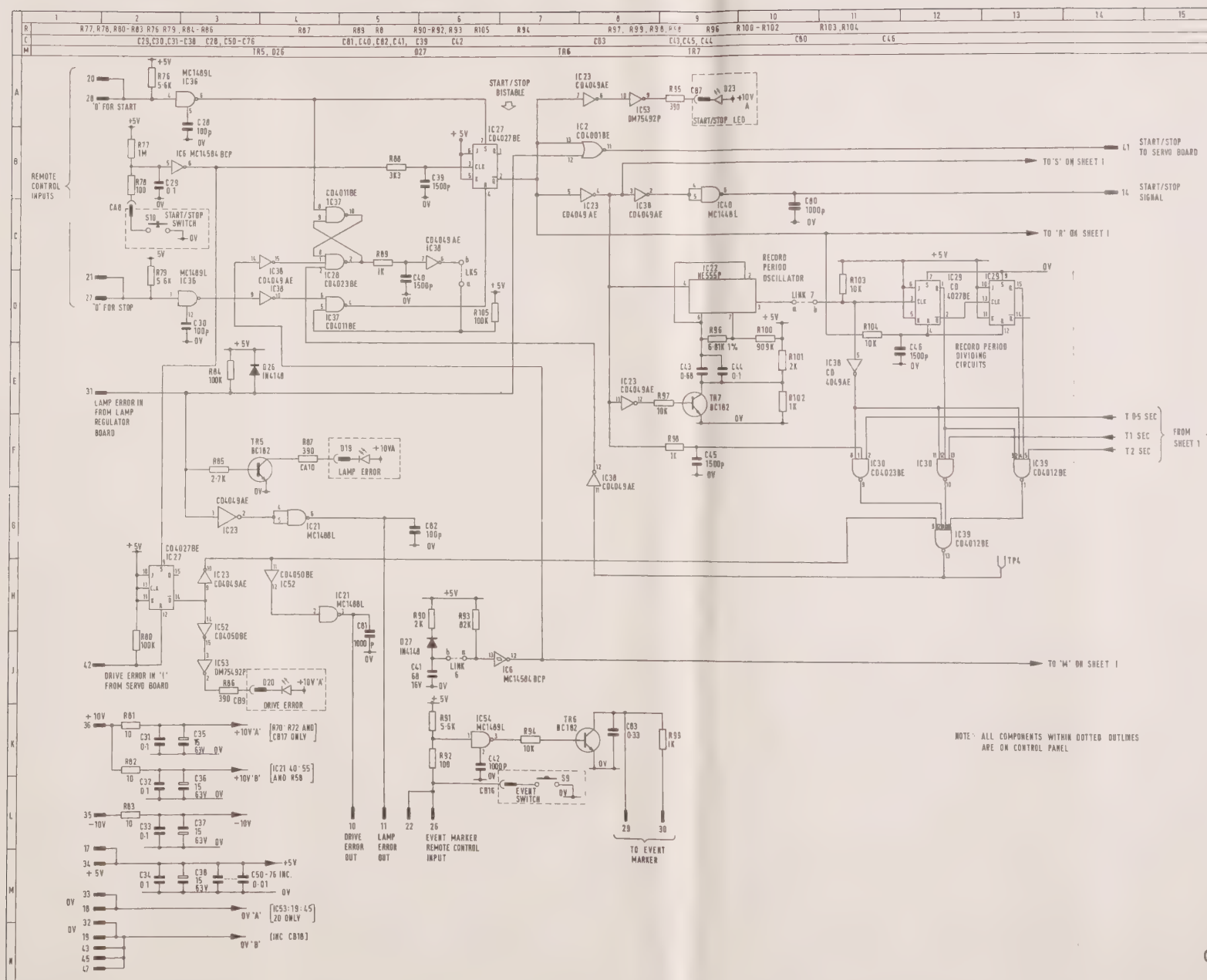
SERVO BOARD FIG.10
CIRCUIT DIAGRAM E84261
ISSUE 9

CONTROL LOGIC BOARD FIG. 11
COMPONENT LAYOUT E84232
ISSUE 2



CONTROL UNIT FIG. 12
CIRCUIT DIAGRAM E84231
SHEET 1
ISSUE 2

SE 6300



IC No.	TYPE	+10V'A'	+10V'B'	+5V	0V'A'	0V'B'	-10V
1	CD4075BE			14		7	-
2	CD4001BE			14		7	-
3	CD4049AE			1		8	-
4	MC1458BCP			14		7	-
5	CD4027BE			16		8	-
6	MC1458BCP			14		7	-
7	CD4027BE			16		8	-
8	CD4027BE			16		8	-
9	CD4027BE			16		8	-
10	CD4011BE			14		7	-
11	CD4012BE			14		7	-
12	CD4027BE			16		8	-
13	NE555P			8		1	-
14	CD4023BE			14		7	-
15	CD4011BE			14		7	-
16	CD4023BE			14		7	-
17	CD4012BE			14		7	-
18	CD4023BE			14		7	-
19	DM75492P			11	4		-
20	DM75492P			11	4		-
21	MC1488L		14			7	-
22	NE555P			8		1	-
23	CD4049AE			1		8	-
24	CD4001BE			14		7	-
25	CD4050BE			1		8	-
26	CD4050BE			1		8	-
27	CD4027BE			16		8	-
28	CD4023BE			14		7	-
29	CD4027BE			16		8	-
30	CD4023BE			14		7	-
31	CD4011BE			14		7	-
32	MC1489L			14		7	-
33	CD4019BE			16		8	-
34	CD4028BE			16		8	-
35	CD4049AE			1		8	-
36	MC1489L			14		7	-
37	CD4011BE			14		7	-
38	CD4049AE			1		8	-
39	CD4012BE			14		7	-
40	MC1488L		14			7	1
41	MC1489L			14		7	-
42	CD4019BE			16		8	-
43	CD4028BE			16		8	-
44	CD4050BE			1		8	-
45	DM75492P			11	4		-
46	CD4078BE			14		7	-
47	CD4011BE			14		7	-
48	CD4001BE			14		7	-
49	CD4017BE			16		8	-
50	CD4068BE			14		7	-
51	CD4011BE			14		7	-
52	CD4050BE			1		8	-
53	DM75492P			11	4		-
54	MC1489L			14		7	-
55	SN72748		7			4	-
56	CD4017BE			16		8	-
57	CD4017BE			16		8	-
58	CD4011BE			14		7	-
59	CD4017BE			16		8	-
60	CD4017BE			16		8	-

CONTROL UNIT FIG.12

CIRCUIT DIAGRAM E84231

SHEET 2

ISSUE 2

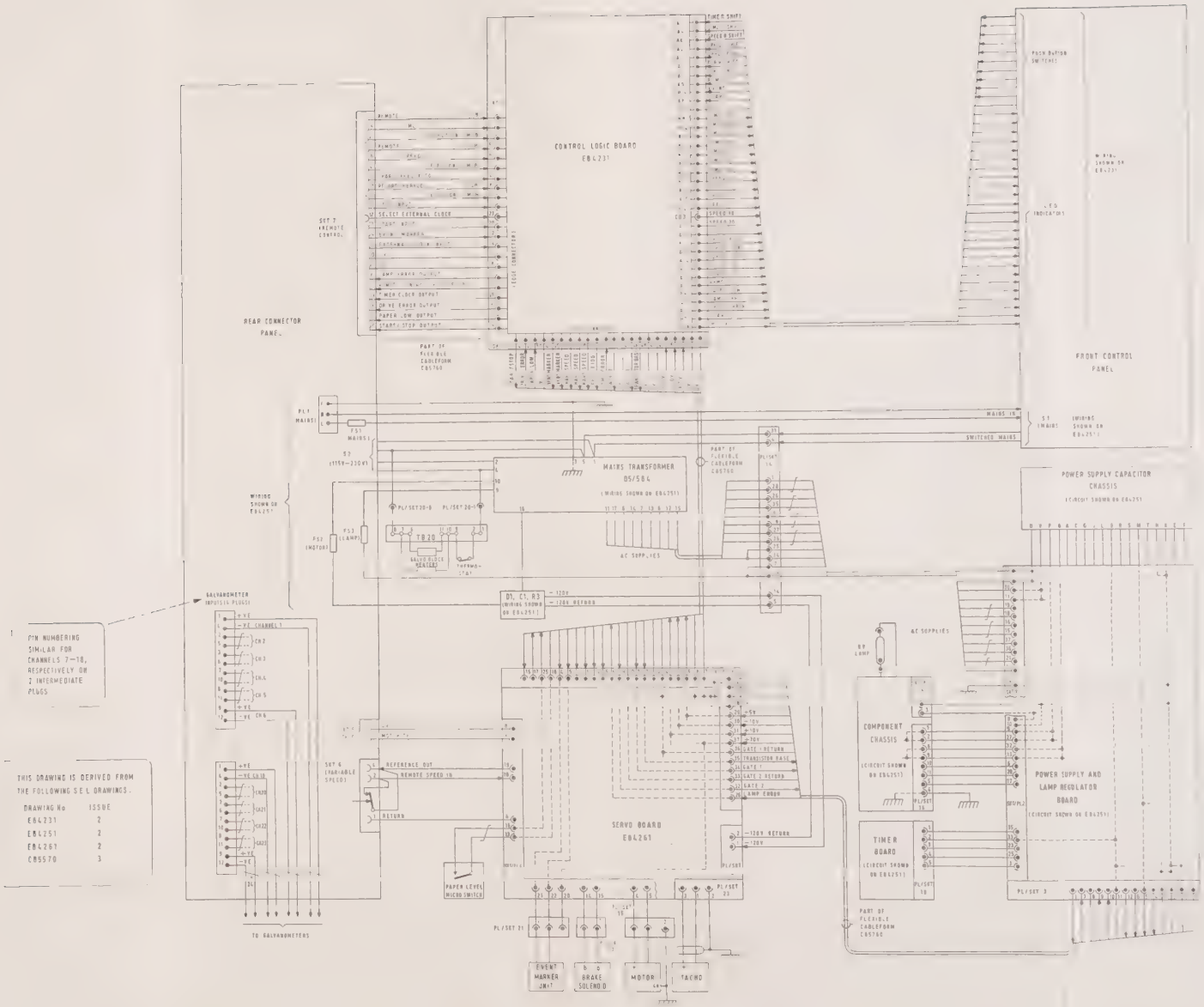
(VIEWED FROM FRONT)

CONTROL PANEL FIG. 13

COMPONENT LAYOUT D84239

ISSUE 1

SE6300



RECORDER INTERCONNECTION DIAGRAM FIG.14

To date,the following types of recording paper are recommended for use in S.E.Recorders. It is stressed that the comments given below are only the Company's opinion of these papers and in no way invalidate or criticise the paper manufacturer's claimed specification:

(a) Agfa-Gevaert, Type Oscilloscript E.(Standard Issue for all Recorders)

(i) *Advantages:* This is a good general purpose paper,having a high writing speed,good temperature stability and excellent performance at slow speeds down to 0.5 mm/min. The paper produces a reasonable contrast and can easily be processed. When the image disappears,it can be regained by processing the paper,using a standard X-ray developer.

(ii) *Disadvantages:* The traces are slow to appear. The paper must be stabilised for permanence of recording (manufacturer's stabiliser available). Contrast a little dull. Image blurs with over-intensity and requires continual adjustment of intensity control to obtain clear image.

(b) Agfa-Gevaert, Type Oscilloscript D.

(i) *Advantages:* This paper has an extremely fast writing speed. It is also unaffected by temperature variations. The record can be easily made permanent by use of the manufacturer's own fluids. The paper is good for all chart speeds.

(ii) *Disadvantages:* The traces tend to become blurred at extreme intensities and are slow to appear. Contrast is spoilt slightly, caused by the strong pink background of the paper.

(c) Kodak, Type 1895.

(i) *Advantages:* The traces are quick to appear. A more permanent record can be obtained by using the xerography copying process.

(ii) *Disadvantages:* The paper is affected by temperature variations during storage,which results in a lower than claimed writing speed. At slow chart speeds (<2.5 mm/s) in S.E.Recorders,*no trace can be obtained unless a fresh,cool,roll of paper is used.* The recording cannot be made permanent by chemical stabilising techniques.

(d) Kodak, Type 1801.

(i) *Advantages:* The paper produces good contrast and excellent quality of trace. The recording can be made permanent by chemical stabilizing techniques.

(ii) *Disadvantages:* At slow chart speeds (<2.5 mm/s) the trace can only just be discerned with the trace intensity control set to maximum. The writing speed is slow.

APPENDIX B

PERMANENT RECORDINGS FROM SE UV OSCILLOGRAPHS

1. INTRODUCTION

1.1 Traces can be made from SE u.v. oscillographs on Kodak or Agfa-Gevaert papers. Kodak 1895 and 2022 papers cannot be chemically stabilised and made permanent. Photo developed records on these particular papers will last for an extended period of time under normal viewing conditions.

1.2 With Kodak Linagraph Direct Print type 1799 and 1801 use D-19,DX-80 or DG-10 for 1 to 3 min at 20°C dish development for non-photodeveloped records. Permatex 517 is used for photo-developed or closed-magazine records - 1 to 4 min at 20°C or Linagraph 308 Monobath.

1.3 In a four tank oscillogram processor the Kodak 'Linagraph' 1000 Liquid Processing Kit is used - 10 ft/min (3 m/min) at 38°C for non-photo-developed records. Use Kodak 'Permatex' 573 Kit at 5 ft to 7 ft/min. (1.5 to 2 m/min) for photodeveloped or closed-magazine records. With Kodak Linagraph Direct Print type 1843 use D-19,DX-80 or DG-10 for 1 to 3 min at 20°C for processing photodeveloped records only in dish development. For processing photodeveloped records only in a four-tank oscillogram processor use Kodak 'Linagraph' 1000 liquid processing kit 10 ft/min (3 m/min) at 38°C (this paper processes to a negative image). With Agfa Oscilloscript D or E use G278 Developer. The instructions that follow are specifically for Agfa Oscilloscript D though they apply equally well to Agfa Oscillograph E. A similar technique can be applied to Kodak papers using dish development and the chemicals listed above.

2. INSTRUCTIONS FOR AGFA-GEVAERT OSCILLOSCRIPT 'D'

2.1 Precautions prior to stabilisation

2.1.1 *Recorded photosensitive paper.* The latent waveforms or images recorded on the photo-sensitive paper may become visible by secondary exposure. If the paper now remains untreated the recorded waveforms will deteriorate under the influence of environmental ultra-violet rays,thus resulting in a limited storage life. In order to achieve archival records on Agfa Oscilloscript 'D',G278 developer is used together with a conventional photographic fixer. After developing and fixing,the stabilised record can be permanently stored under average conditions.

2.1.2 *Secondary exposure.* If the purpose of secondary exposure is merely to identify the recordings,the process is not critical. If the record is to be developed and stabilised,a correct secondary exposure procedure is essential.

2.1.3 A white fluorescent lamp with an illumination of 250 to 450 lux on the paper surface is considered ideal (the intensity of illumination of a surface 40 cm to 60 cm from and radiated by a 10 watt white fluorescent lamp is 250 to 450 lux). With this intensity of illumination,a blue image of waveforms appears against a pink background in 15 to 30 seconds

and the contrast of the image will improve with time. If the exposure is too long,the colour of the recorded waveform will gradually change from dark blue to red-brown with decreased density of the image. If this stage is reached stabilisation will be poor and may even cause loss of the recorded waveforms. The correct duration of exposure is usually between 1 to 15 minutes with a maximum of 30 minutes.

2.1.4 If the intensity of illumination is too high during secondary exposure or the exposure is carried out by a light source over-rich in ultra-violet rays,an over-exposure will result,changing the colour of the background into a similar blue to the recorded waveform thus rendering the image contrast poor. It should be noted that the intensity of illumination indoors,close to a window,can be from 3000 to 4000 lux on a fine summer day even if the window is not in direct sunlight. Secondary exposure in such a position will certainly result in over-exposure. The secret of success in good stabilisation lines in sufficient exposure in a weak light.

2.1.5 Stabilisation can be followed immediately after the secondary exposure stage. For better results,however,it is advisable to leave the record for a day or so. Store the exposed paper in a lightproof container.

2.2 Preparation of the stabilisation chemicals

2.2.1 *Developing solution (G.278).* A box of developer contains three packs of chemicals, A,B and C. Proceed as follows:

(a) Add the chemicals to 750 cc of water at about 40°C in the order A,B and C.

(b) Agitate the solution *after* the addition of each chemical until all the chemicals are completely dissolved.

(c) Add 250 cc of water to make up solution of 1000 cc in total. Since 1000 cc of developing solution can treat approximately one roll of paper 150 mm x 30 m long,prepare the developing solution in accordance with the amount of paper to be treated.

——————— CAUTION ———————

The developing solution may sometimes sting the skin.

2.2.2 *Stopping solution (SB-1-E.K.)* The stopping solution is used to prevent the fatigue of the fixing solution and to obtain a good stable record. Compound the stopping solution by adding 48 cc of 38% acetic acid to 1000 cc water.

2.2.3 *Fixing solution.*

(a) Add a common photographic film fixer to the specified amount of water at a maximum 30°C.

(b) Thoroughly agitate the solution until the fixer is completely dissolved.

2.3 Treatment procedure

The correctly exposed record having dark blue waveforms against a pink background will stablise into dark brown waveforms contrasted against a grey-brown background.

2.3.1 *Lighting the treatment room.* Since a fluorescent lamp affects secondary exposure,a tungsten filament incandescent bulb should be used to light the room. The angle of incidence of the rays from the bulb must be a maximum of 60 degrees and the distance from lamp to solution must be greater than 1 metre.

2.3.2 *Temperatures of solutions.* The temperature of the developer during stabilisation is very important. The developer,stopper and fixer must be at between 18°C and 22°C. If the solution temperature is lower than 18°C,a longer developing time is required. If the temperature of the solution is too high,the background colour becomes dark brown before the completion of the development time. In either instance,a poor contrast results. A double tray system assists in maintaining constant solution temperatures.

2.3.3 *Treatment.* Since the time required for development depends upon the definition of the registered image,and the secondary exposure condition etc,the processed paper is immersed in the developing solution for between 1 and 4 minutes until the colour of the image becomes dark brown with optimal contrast. For best results use a test sample of the piece of sensitised paper to be treated. Since the chemical solution will gradually fatigue as the amount of paper being treated increases,extend the duration of treatment by degrees. Do not,however,try to treat more paper than specified by the chemical manufacturer.

2.4 Washing

2.4.1 Wash the material in running water for about 10 to 15 seconds.

2.5 Stopping

2.5.1 Immerse the material in the stopping solution for about 10 seconds.

2.6 Fixing

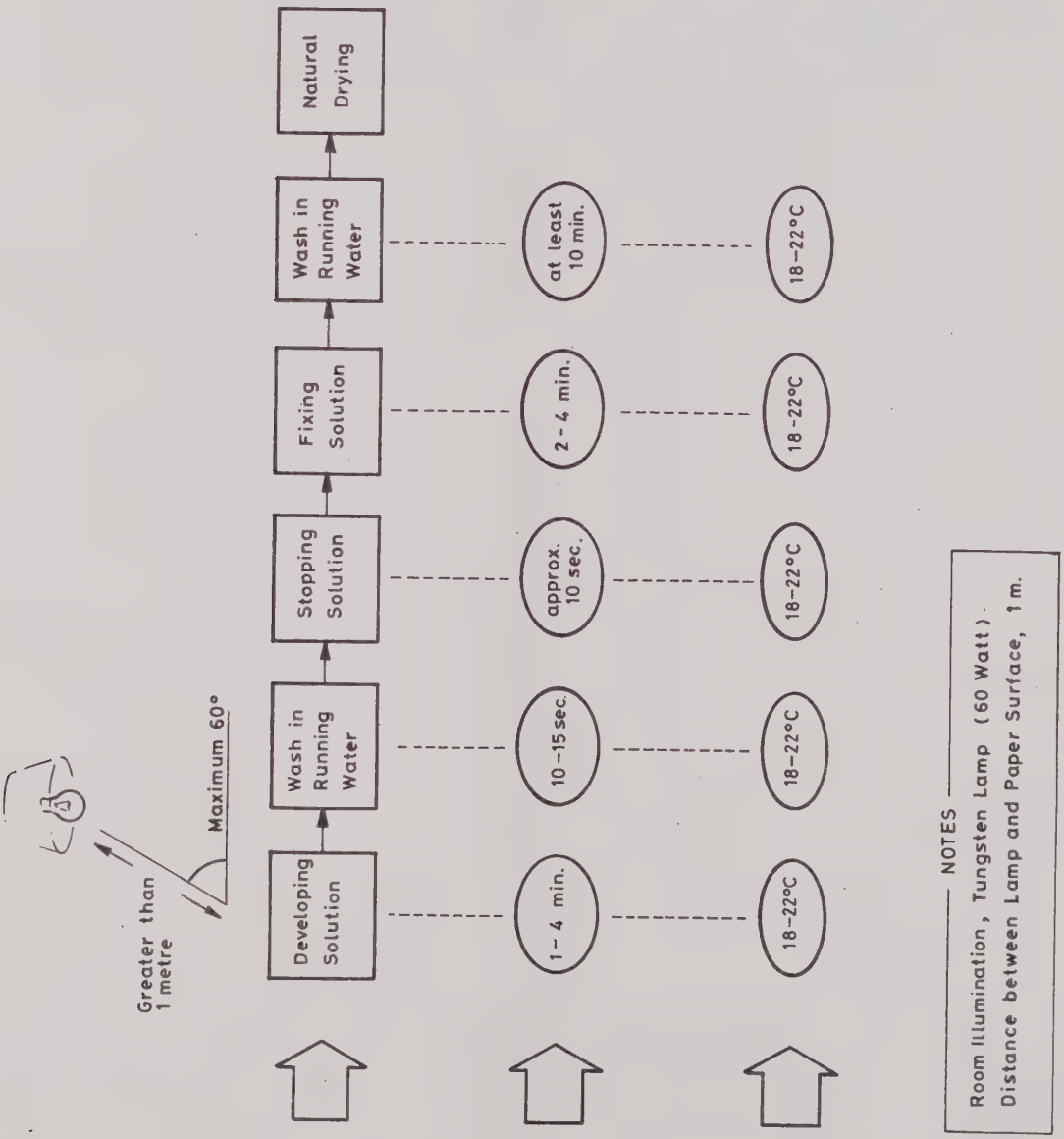
2.6.1 Soak the material in the fixing solution for 2 to 4 minutes. If a large quantity of material is treated,increase the duration of fixing accordingly. The longer the paper is kept in the fixing solution,the thinner will the image become. Fixing must be completed in 10 minutes.

2.7 Final Washing

2.7.1 Wash the material in running water (18 to 22°C) for at least 10 minutes. Insufficient washing in clear water will result in discolouration after drying.

2.8 Drying

2.8.1 Leave the material to dry naturally. For a small amount of material, washing after developing and immersing in stopper can be omitted. When storing the developing and fixing solutions, fill the containers to capacity, keep cool and store in the dark.



EMI SE Labs

supplement

SUPPLEMENT NO. 6300

TAKE UP UNIT

SE 6300

Issue 1

April 1980

MS 50097

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TAKE-UP UNIT SE 6300

HISTORY SHEET

MANUAL ISSUE	TEXT	CIRCUIT/LAYOUT DIAGRAMS	REMARKS
1			APRIL 1980

TAKE UP UNIT

SE 6300

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1. GENERAL INFORMATION

1.1 The take up unit can be attached to the front of an SE 6300 UV Recorder to spool recorded paper automatically as it is fed out from the recorder. The take up unit is driven directly from the paper drive system in the recorder.

1.2 The rubber capstan (see fig 3.1) on the take up unit bears against the paper at the point where the recorder's paper drive roller is behind the paper. Two belts and 2 clutches located in the right-hand end compartment of the take up unit transfer the drive from the capstan shaft to the take up spool. The drive is coupled through a free-wheeling clutch to give the take up spool high acceleration when the recorder is started. While the recorder is running steadily, the take up drive is via the magnetic clutch.

1.3 When the take up unit is used, it may not be possible to achieve a chart drive speed of 5 m/s. However, the use of timing lines on the recording reveals the time relationship of the recorded signals.

2. INSTALLATION AND OPERATION

2.1 Attaching the Take Up Unit (fig 3.1)

The cassette release flap on the recorder must be replaced by a special flap in order to attach the take up unit. The procedure is as follows:

(a) Lift the cassette release flap on the recorder to the unlocked position and lower the paper cassette.

(b) While holding the cassette release flap remove the 4 screws securing the flap from the underside, 2 at each end.

(c) The cassette release flap can now be lifted off and the special flap positioned in its place.

(d) While holding the special flap, secure it to the release mechanism with the screws removed from the original cassette release flap.

(e) With the cassette closed and 6cm-8cm of paper protruding from the recorder, position the rear (open side) of the take up unit in front of the recorder.

(f) Tilt the top of the take up unit slightly toward the recorder and press the take up unit against the recorder so that the ridge across the top at the rear of the take up unit slides into the groove on the special flap installed above. Ensure that the nylon catches at the top rear corners of the take up unit lock the unit into position.

2.2 Loading the Take Up Unit (fig 3.1)

(a) Open the take up unit : the top and front single-piece cover is hinged at the bottom.

(b) If the adjustable cheek is set correctly for the width of recording paper to be used, proceed to step (f). Otherwise, remove the take up spool after pressing the spring-loaded left-hand end cheek to the left.

(c) Slide the adjustable cheek to the left along the take up spool to disengage the cheek from the rubber ring beneath it.

(d) Slide the rubber ring onto the appropriate groove in the spool and slide the cheek over the ring to lock the cheek in position. Remove the ring and cheek from the spool if 12 in paper is to be used.

(e) Re-insert the take up spool after pressing the left-hand end cheek to the left.

(f) Pull out approximately 20cm of paper from the recorder, pass it under the spool and insert the free end of the paper into the spool slot.

(g) Turn the spool by hand to wind the paper around the bottom until at least 1 layer of paper is anchored onto the spool. (The spool turns easily in the correct direction). Ensure that paper is taut.

(h) Lift and close the take up unit cover. The take up unit is now prepared to spool the paper automatically as it comes out of the recorder.

2.3 Removing the Take Up Unit (fig 3.1)

(a) Open the take up unit cover.

(b) Remove the take up spool after pressing the spring-loaded left-hand end cheek to the left. Tear the recording paper using the cutting edge on the top extrusion if necessary.

(c) Release the take up unit from the recorder by pressing in the catch release buttons at the top rear corners on each side of the take up unit.

(d) The take up unit can now be moved away from the recorder.

3. MAINTENANCE AND ILLUSTRATED PARTS BREAKDOWN

3.1 Belt Renewal (fig 3.1)

In order to renew either of the belts, it is necessary to remove the clutch and drive assembly from the take up unit. The procedure is as follows:

(a) Remove the take up unit from the recorder as in para 2.3.

(b) Rest the take up unit on its rear (open) side with the cover closed.

(c) Remove the 2 screws at the right end in the bottom of the unit.

(d) Turn the unit to rest on its bottom and open the hinged cover.

(e) Remove the 2 right end upper casting screws.

(f) The clutch and drive assembly can now be pulled away from the take up unit taking the capstan shaft with it. Care must be exercised to avoid damaging the capstan or its shaft.

(g) The 3 inner side plate fixing screws must now be removed from the take up spool side. This allows the right end casting to be removed.

(h) The belts can now be removed by sliding them off the capstan shaft pulleys and then over the magnetic clutch.

(j) New belts can be installed by sliding them first over the magnetic clutch and then onto the appropriate pulleys.

(k) Slide the end of the clutch drive shaft into the bearing in the end casting, taking care not to damage the bearing.

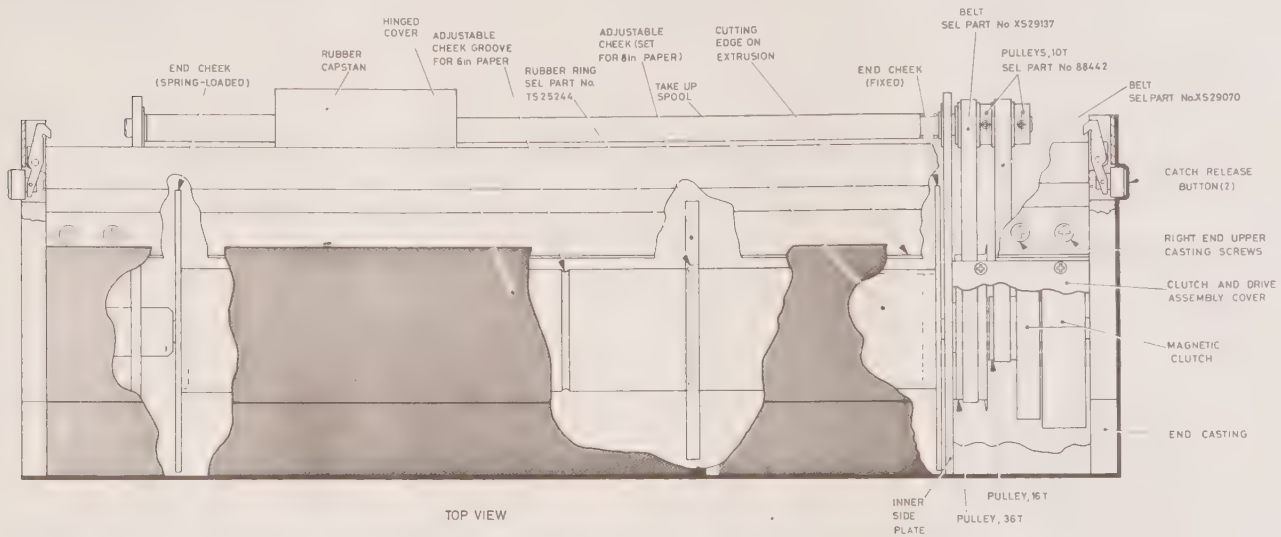
(m) Insert and tighten the 3 screws securing the inner side plate to the end casting.

(n) Place the clutch and drive assembly in its position at the right end of the take up unit and carefully guide the left end of the capstan shaft into its bearing.

(p) Insert and tighten the 2 right end upper casting screws.

(q) Close the hinged cover and turn the unit to rest on its rear (open) side.

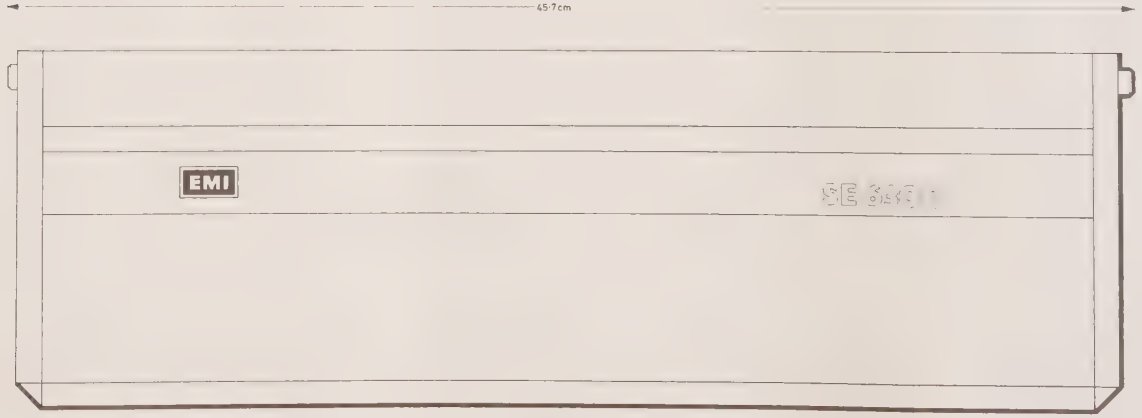
(r) Insert and tighten the 2 screws at the right end in the bottom of the unit. The take up unit is now ready for use.



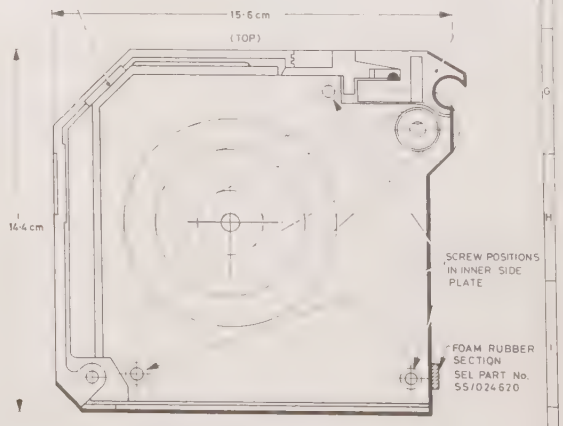
TOP VIEW

NOTES

THIS DIAGRAM WAS DERIVED FROM THE FOLLOWING SEL DRAWINGS
D88457 ISSUE A
D88458 ISSUE A
E88460 ISSUE 2



FRONT VIEW



RIGHT END VIEW WITH END CASTING REMOVED

TAKE UP UNIT-ILLUSTRATED PARTS BREAKDOWN FIG 3.1

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Requested Change(s) to Technical Manual

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